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FOOD PROTECTION TRENDS

SCIENCE AND NEWS FROM THE INTERNATIONAL ASSOCIATION FOR FOOD PROTECTION

DECEMBER 2003

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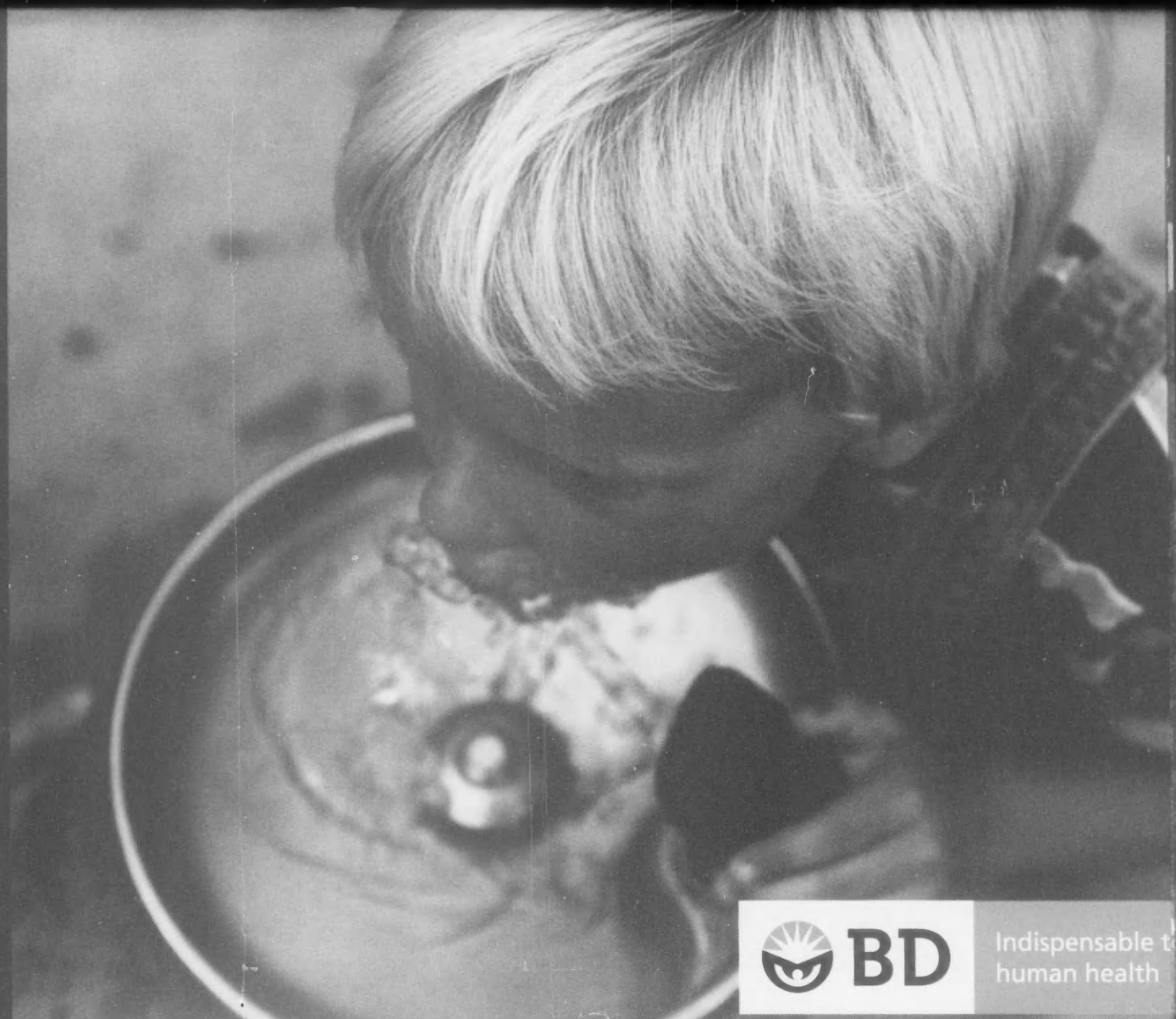

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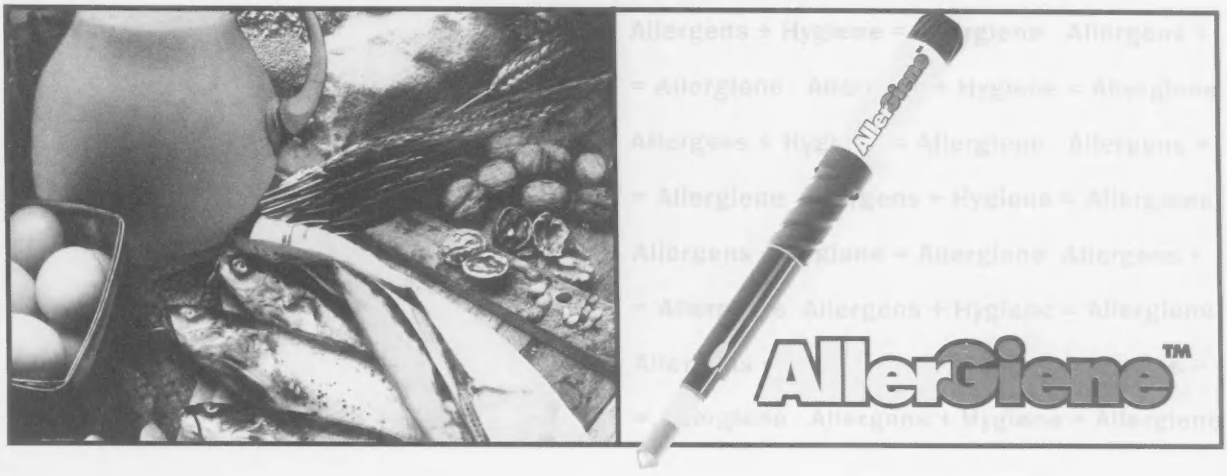

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VOLUME 23, NO. 12

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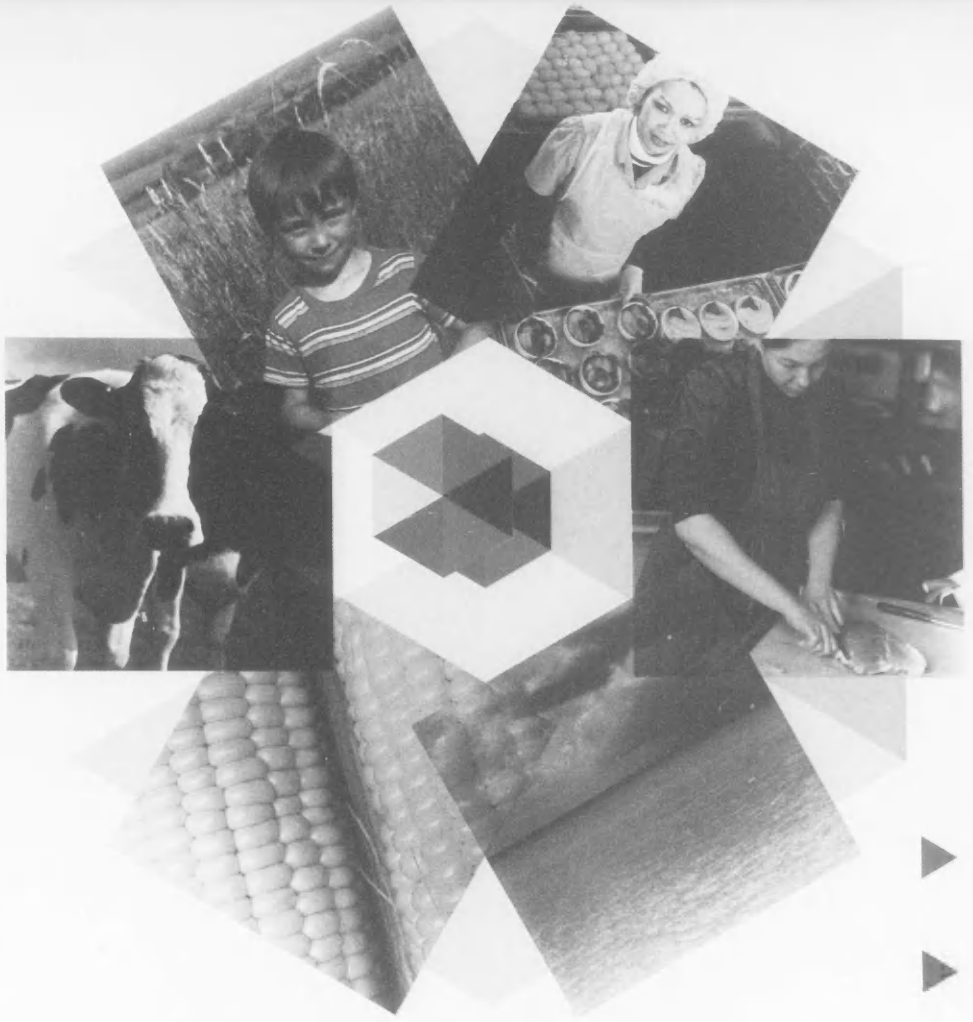

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FOOD PROTECTION TRENDS
SCIENCE AND NEWS FROM THE INTERNATIONAL ASSOCIATION FOR FOOD PROTECTION

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International Association for Food Protection

FOOD PROTECTION TRENDS

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"PRESIDENT'S" PERSPECTIVE

By **PAUL A. HALL**
PRESIDENT

"May your hopes rise to the stars!"

Henry Ford, the great American inventor and entrepreneur once said, "You can do anything if you have the enthusiasm. Enthusiasm is the yeast that makes your hopes rise to the stars." I believe that all of us should approach whatever task is at hand with enthusiasm and energy — even the most mundane or boring of tasks. It's all a matter of perspective. Chances are that if you approach a challenge with enthusiasm and energy, it will get done sooner and will be better than if you approach it with dread or ambivalence.

Another great American, the sixteenth President of the United States, Abraham Lincoln said, "Things may come to those who wait, but only the things left by those who hustle." It's the act of doing that gets things done. Enthusiastically taking action to get things done, whether in your professional life or your personal life, usually ensures an outcome that you want – allowing your hopes to rise to the stars, as Henry Ford put it.

What does all of this have to do with IAFP? I have been blessed to have made many friends over the years though my association with IAFP. I have served on many committees and worked with a number of individuals that served with enthusiasm and energy over the years. One great example of this is the recent initiative to develop International Food Safety Icons for the foodservice and retail food segments of our industry. This initiative was spearheaded by Frank Yiannas through our Retail Food Safety and Quality Professional Development Group. These International Food Safety Icons are pictorial representations of important food safety tasks conducted in restaurants and foodservice establishments that can be recognized and understood regardless of an individual's native language. This effort has been well received and has been unanimously endorsed by the National Restaurant Association's Board of Directors. This Board-approved resolution is very prestigious and gives our food safety icons the highest form of recognition by the NRA. Frank and the Retail Food Safety and Quality PDG are to be commended for their enthusiastic and exuberant work on this project. Mark Carter, another active IAFP member, is taking up the banner and is spearheading an initiative to develop a series of International Food Safety Icons that can be used in food manufacturing plants. We look forward to Mark's enthusiastic leadership in this area. If you are interested in learning more about these icons, please visit IAFP's Web site at www.foodprotection.org.

IAFP has a number of Professional Development Groups in addition to the Retail Food Safety and Quality PDG. There are a total of thirteen PDGs ranging from the Applied Laboratory Methods PDG to the Meat and Poultry Safety and Quality PDG to the Water Safety and Quality PDG. The purpose of these PDGs is to promote professional development in specific disciplines or areas of interest consistent with the goals of IAFP. The PDGs are a great way to meet colleagues and make friends that have a common food safety interest with you. If you not already involved with a PDG, I encourage you to enthusiastically get involved. It will be a rewarding experience both professionally and personally. If you're interested in starting a PDG in an area that isn't currently covered by an existing PDG, I encourage you to contact any of the Executive Board members or David Tharp, IAFP's Executive Director in Des Moines.

I would like to close this month's column by enthusiastically wishing everyone a safe and joyous holiday season. Spend time with your family, friends and loved ones. They are what truly count in the big picture. Renew your energy so that you may approach 2004 with enthusiasm and zest. Take action to get the most out of the upcoming year both personally and professionally. Most of all, may your hopes rise to the stars! As always, please share your thoughts with me at phall@kraft.com.

Until next month...

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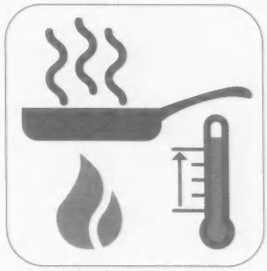
Potentially Hazardous Food

Cooking



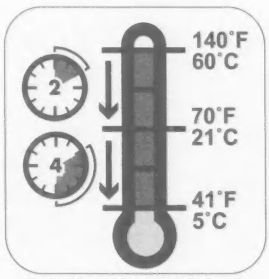
Do Not Work If Ill

Cross Contamination

Wash, Rinse, and Sanitize

No bare hand contact

Cooling



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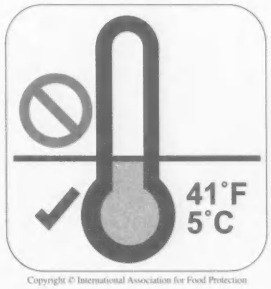
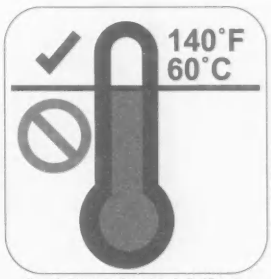


Hot Holding



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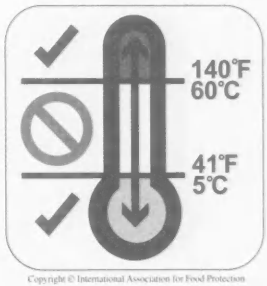

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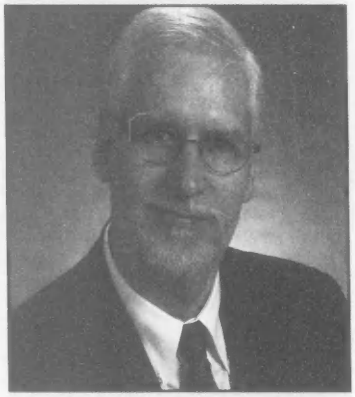
"COMMENTARY"
FROM THE EXECUTIVE DIRECTOR



By DAVID W. THARP, CAE
EXECUTIVE DIRECTOR

"There is a lot to be excited about when looking at the Association financial position"

I can't wait to tell you the fantastic news! Our financial audit was just completed and the results are quite exciting. We now have a positive fund balance for the first time since 1988. That is a period of more than 15 years since we have had the Association in the black. It has been a long process to achieve this goal, but the work is not over yet. It is far from over.

Let me share the news now. This past year (our financial year ends on August 31), we had a net excess of revenue over our expense of just more than $90,000. This is the best result we have experienced in the 10 years that I have been with the Association. In comparison to the prior year when our expense exceeded revenue by a little more than $60,000, you can see why this is fantastic news! Not only did we erase last year's loss, but also we now end the year with a positive fund balance. Added together, this accounts for over a $150,000 swing when the two years are taken together.

If you are like me, I am asking what took place to help us have such a successful year? Here are some highlights. In 2002, we had a great Annual Meeting but as I had explained in a prior column, San Diego was an expensive location for us. In addition to cost differences (we made a number of efforts to reduce expense without reducing quality), our attendance was up, exhibitor participation at IAFP 2003 increased dramatically and sponsorship monies increased by about $33,000. Our Annual Meeting netted $95,000 more when comparing 2003 to our 2002 results. That is a huge portion of the $150,000, but allow me to point out some other components that lead to this successful, year-end result.

For the year ending August 31, 2002, the Association investment account decreased in value by about $22,000. During the year ending August 31, 2003, we gained value in our investment account in the amount of $20,000 creating a $42,000 difference from one year to the next. Thank goodness the economy recovered to help us along to our record year!

Another factor in our successful year is that we purposely looked to reduce our printing and postage costs for Membership communications, Membership invoicing and other printing and postage costs (including Annual Meeting related). It is not that we don't want to communicate with you; it is just that there are much more cost effective ways to do this than to always print and mail a communication piece to our Members. You may have noticed a few more E-mails from IAFP over the past year. This, of course, is a cost-effective way to communicate with IAFP Members. We saved more than $20,000 in printing and postage costs in the year ending August 31, 2003! That is a lot of money in a budget that projects only $8,000 net revenue over expense!

So, as you can see, there is a lot to be excited about when looking at the Association financial position! We continue to work on expense reductions to keep IAFP financially strong. This is forever our goal.

I mentioned that we have a lot of work left to do on our financial position. It is recommended by the American Society of Association Executives (an association for associations) that associations should have a fund balance equal to one half of their operating budget. For IAFP that means that our General Fund balance should be at or above $850,000. Now in all truthfulness,

I'm not sure that we can achieve that in my lifetime, but the goal is out there for us. We would have to net $80,000 each year for the next 10 years! We may not be able to net $80,000 each year, but I do think that we can add to the General Fund balance each year and have it growing in the right direction. That is an achievable goal. You know what they say; you CAN eat an elephant — one bite at a time!

Editor's note: See page 1062 for the year ending August 31, 2003 financial results.

ARTICLES

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International Association for Food Protection

Monte Carlo Simulation of the Shelf Life of Pasteurized Milk as Affected by Temperature and Initial Concentration of Spoilage Organisms

DONALD W. SCHAFFNER,* JENNIFER McENTIRE, SIOBAIN DUFFY, REBECCA MONTVILLE and SARAH SMITH
Food Science Building, Rutgers University, 65 Dudley Road, New Brunswick, NJ 08901

SUMMARY

Predictive microbiology and quantitative microbial risk assessment are rapidly developing disciplines that use mathematical models to quantitatively estimate the presence and growth of microbes in food products. This report explains how these techniques were used in troubleshooting a milk spoilage problem. The central objective of this article is to demonstrate the concept and value of Monte Carlo simulation in a simple manner, such as could be adapted by interested food processors and used as a guide for their own studies.

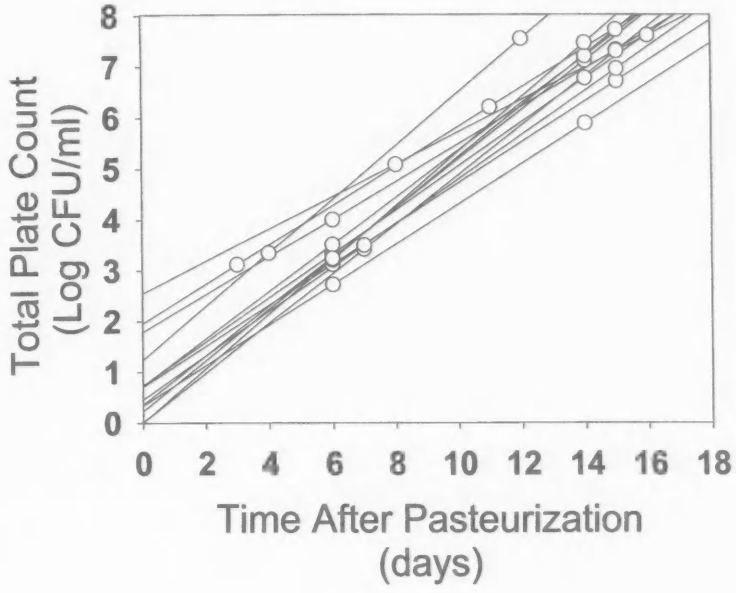
Generation times, initial concentrations of spoilage organisms found in milk, and storage temperature data were fit to probability distribution functions. Monte Carlo simulation results indicate that slight decreases (of 2.1°C) in average storage temperatures significantly increased the simulated shelf life of pasteurized milk (more than 50% less psychrotrophic spoilage by 14 days), especially in those simulation samples contaminated with mesophilic bacteria (almost 75% less spoilage). When the average storage temperature was reduced by 2.1°C, storage temperature variability by 1°C, and average initial microbial contamination levels by 0.5 Log_{10} CFU/ml, this significantly lengthened shelf life when either mesophilic (1% spoilage by 14 days) or psychrotrophic (9% spoiled by 14 days) microbes were present.

Microbial simulation tools used primarily for food safety risk assessment can also be used to predict microbial spoilage and may be of value to the food industry.

A peer-reviewed article

*Author for correspondence: Phone: 732.932.9611 ext. 214; Fax: 732.932.6776;
E-mail: schaffner@aesop.rutgers.edu

FIGURE 1. Total plate count in milk samples used to determine generation time and initial microbial population



INTRODUCTION

Technological advances in the dairy industry have resulted in pasteurization at higher temperatures and finished products with reduced levels of post-pasteurization contamination *(9)*. During extended storage at temperatures less than <6.0°C *(17)*, thermoduric psychrotrophic microorganisms, particularly *Bacillus* spp., have been shown to be the determining factor in the shelf life of pasteurized milk *(9)*. Maxcy and Liewen reported that psychrotrophs and mesophiles had equal growth rates at 22°C; yet below this temperature, psychrotrophs grew increasingly faster *(14)*. Temperature abuse of milk can result in a shift of the dominant microflora to mesophilic microbes. Pasteurized milk is known to be spoiled when log CFU/ml of psychrotrophic organisms reaches 6 to 7.5 *(20)*, and the United States Pasteurized Milk Ordinance requires that standard plate count not exceed 20,000 CFU/ml (log CFU/ml of 4.3) *(8)*.

Both gram-negative microorganisms (including *Pseudomonas*, *Achromobacter*, *Aeromonas*, *Serratia*, *Alcaligenes*, *Chromobacterium*, and *Flavobacterium*) and gram-positive microorganisms (including *Bacillus*, *Clostridium*, *Corynebacterium*, *Streptococcus*, *Lactobacillus*, and *Microbacterium*) have been identified in pasteurized milk that has been stored at 0°C. Generation times of psychrotrophic spoilage organisms have been shown to decline sharply with increased temperature up to 15°C. Above 15°C, generation times decreased only slightly with temperature *(10)*. The shelf life of pasteurized milk has also been shown to be dependent on the initial psychrotrophic counts *(10)*. The initial microbial populations in freshly pasteurized milk are highly dependent on post-pasteurization contamination *(20)*.

Predictive microbiology and quantitative microbial risk assessment are rapidly developing disciplines that use mathematical models to quantitatively estimate the presence and growth of microbes in food products *(23)*. These models allow for the prediction of the safety and/or shelf life of a product, based on an entire sequence of processing and storage events. They can also accommodate alternative processing scenarios. Monte Carlo simulations use probability distributions based on previously collected data to predict the shelf life of food products during changes in environmental factors (e.g., storage temperature) *(3)*. There are several predictive models in the literature that predict time-to-spoilage in various foods *(1, 2, 13, 18)*, but these studies do not examine how post-processing storage can affect the shelf life of those products.

We have developed a computer simulation to predict the shelf life of pasteurized milk as a function of such variables as initial microbial contamination, type of spoilage microorganisms (psychrotrophic or mesophilic), and storage temperature. The resulting predictions include a range of expected responses rather than a single expiration date. These simulations are able to predict not only the average shelf life of a carton of milk for a particular storage scenario, but also what fraction of cartons will be spoiled at the end of the desired shelf life.

The central objective of this exercise was not to develop the ultimate and definitive computer simulation for milk spoilage, but to demonstrate the concept and value of Monte Carlo simulation in a simple manner, such as could be adapted by interested food processors and used as a guide for their own studies.

FIGURE 2. Actual generation times at 5.6°C and the simulated normal distribution of generation times with a mean of 17.5 h and a standard deviation of 3.0 h

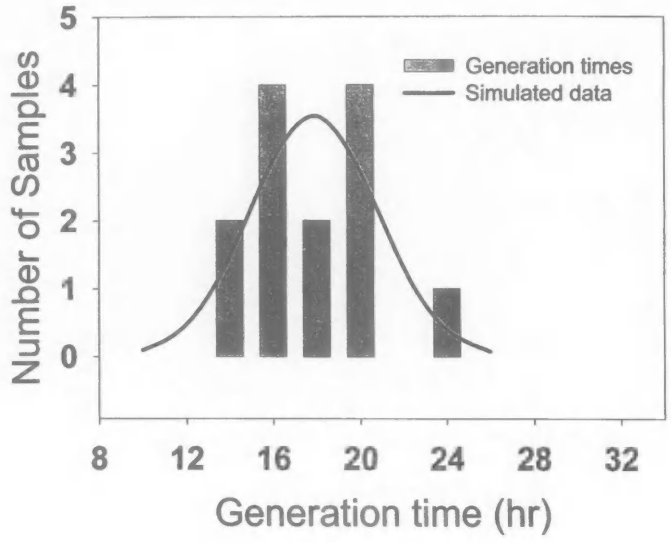
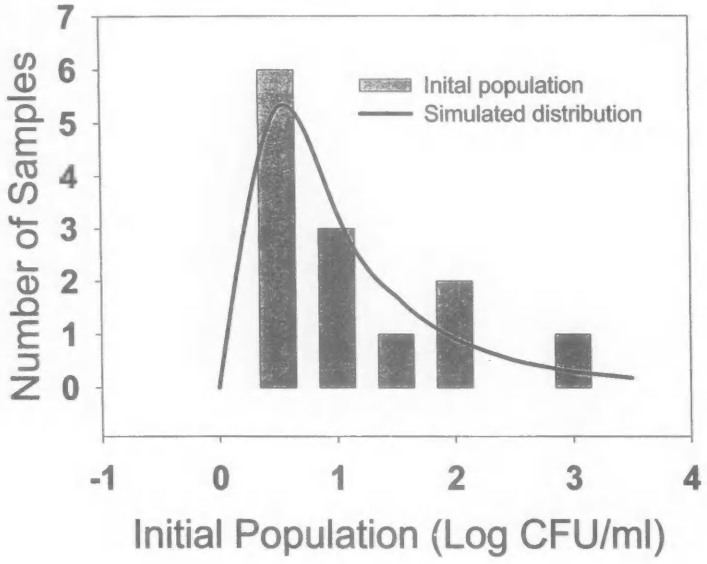


FIGURE 3. Actual estimated initial microbial populations and the simulated log normal distribution of initial microbial populations with a mean of 1 Log_{10} ml and a standard deviation of 0.9 Log_{10} ml



MATERIALS AND METHODS

Experimental

Cartons of pasteurized milk were collected from a local supermarket chain and analyzed for total aerobic count *(7)*. Duplicate samples were collected at the same time and transported to the chain's corporate headquarters for storage at the recommended temperature (5.6°C). Total plate counts of these samples were determined at or near the end of their projected shelf life. Microbial growth rates at 5.6°C and initial concentrations of spoilage microbes were determined by simple linear regression from this data (Fig. 1). Temperatures of more than 20 milk cartons were determined using stem and dial thermometers during visits to several supermarket chain stores in North and Central New Jersey.

Simulation

Complexity limiting assumptions. During normal production, milk is processed, transported to retail stores, and held at refrigeration temperatures until the time of purchase. Following purchase, milk is transported to the consumer's home and once again stored at refrigeration temperatures until consumption. Limited data were available for this project, so only the effect of processing and storage in the store were modeled. Data were included in the simulations for an initial number of microorganisms at the end of pasteurization. It was assumed that microbial counts did not change during transport to the supermarket. It was also assumed that the milk was stored for its entire shelf life in a refrigerator in the supermarket at constant temperature. Actual conditions in the distribution channels are much more complex than assumed here. Future studies could expand upon the analysis presented here, by use of temperature logging and more

FIGURE 4. Actual in-store milk temperatures and the simulated normal distribution of in-store milk temperatures with a mean of 6.5°C with a standard deviation of 2.0°C

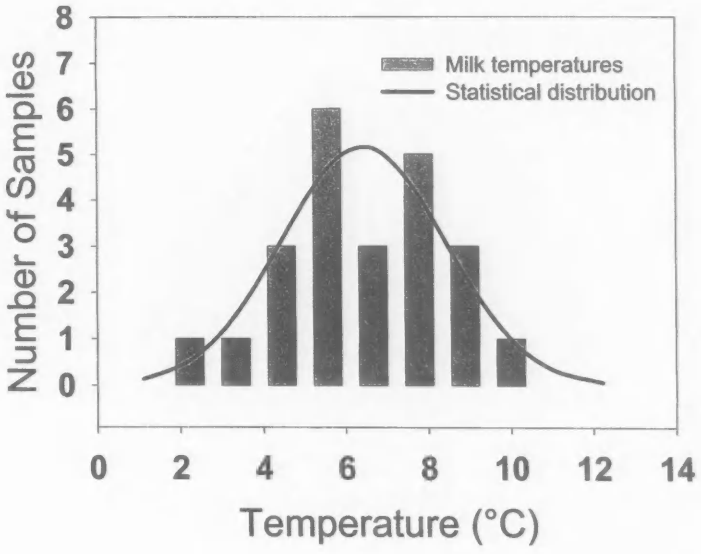
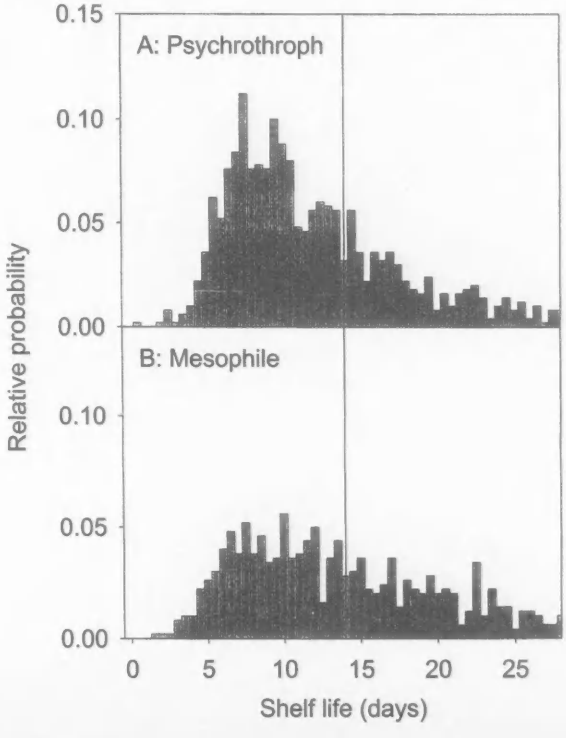


FIGURE 5. Milk shelf-life simulation results assuming: microbes are all psychrotrophs (A) or all mesophiles (B); in-store milk temperatures with a mean of 6.5°C and a standard deviation of 2.0; initial microbial populations with a mean of 1 Log_{10}/ml and a standard deviation of 0.9 1 Log_{10}/ml. Vertical line at 14 days represents target shelf life



complex microbial models that address changing temperatures *(21)*. It should also be noted that fluid milk is a structurally simple system to model. Studies with more complex foods would need to take food structure into consideration *(22)*.

Growth model. The effect of temperature on the growth rate of milk spoilage microbes was estimated from the data of Maxcy and Liewen *(14)* as presented by McMeekin et al. *(15)*. It was assumed that the temperature-induced changes in growth rate of psychrotrophs and mesophiles were identical to those proposed by Maxcy and Liewen *(14)*. The minimum growth temperatures (T_o) for psychrotrophs and mesophiles were assumed to be -1.19 and 2.41°C, respectively, an estimate based on the growth rate at 5.6°C, extrapolated to zero.

Distribution fitting. It was assumed that the entire initial population was either psychrotrophic or mesophilic in nature for each carton of milk, and the respective T_o values were used in the growth rate equation for the simulation. These data were collated into histograms by use of Excel and analyzed with BestFit (Palisades Decision Corp., Newfield, NY) to create a probability distribution function (PDF). Data collected on generation times at 5.6°C and the normal distribution fitted to the data with mean 17.5 h are given in Figure 2. Similarly, a lognormal distribution was used to represent the initial microbial populations with mean and standard deviation values of 1.0 CFU/ml and 0.9, respectively (Fig. 3). The actual temperatures of milk storage in retail stores collected by an independent laboratory were modeled with a normal distribution, with mean 6.5°C and standard deviation 2.0 (Fig. 4).

Integration into @risk. These PDFs were coded into @Risk simulation software (Palisades Corporation,

TABLE 1. Variables used in Monte Carlo simulation of the shelf life of pasteurized milk

Description	Units	Variable name	Description
Store refrigeration temperature	°C	T	Normal (6.5, 2)
Growth rate variability	Percent	V	1-(Normal (0,17)/100)
Initial microbial population	Log_{10} CFU/ml	No	Lognormal (1, 0.9)
Spoiled microbial population	Log_{10} CFU/ml	N	7
Growth needed to cause spoilage	Log_{10} CFU/ml	N_d	$N - N_o$
Minimum growth temperature	°C	T_{min}	Psychrotroph = -1.19; Mesophile = 2.41
b value	Log_2 CFU/ml h C	b	Psychrotroph = 0.03578; Mesophile = 0.05273
Growth rate	Log_2 CFU/ml/h	G	$((T - T_{min})*b)^2$
Adjusted growth rate	Log_2 CFU/ml/h	G'	G + V
Growth rate adjusted to Log_{10} scale	Log_{10} CFU/ml/h	G"	$G' * Log_{10}(2)$
New shelf life	Hours	SLH	$N_d/G"$
Shelf life	Days	SL	SLH/24

Newfield, NY) as shown in Table 1. Random values of initial microbial concentration and in-store milk temperature (Fig. 4 and 5) were selected from the appropriate distribution during the simulation. A modified square root equation was used to predict an average microbial generation time at the simulated temperature *(15)*. The variability around that average generation time was estimated, using a normal distribution (Fig. 3). Each simulation run (or iteration) calculated the simulated shelf life of a virtual carton of milk that expired when the total microbial count reached 10^7 CFU/ml. This endpoint was chosen specifically because the objective of this project was to model spoilage. It should be noted that any other suitable endpoint (e.g., 20,000 CFU/ml) could also be used *(11)*. At least 1,000 iterations were used to predict the shelf life of a virtual carton of milk under varying conditions.

RESULTS

Current situation

Simulations utilizing the data described above assumed that the main spoilage organisms initially present in pasteurized milk were either all psychrotrophic or all mesophilic in nature. At a mean storage temperature of 6.5°C (Fig. 5a), increasing numbers of simulated samples containing psychrotrophs started to reach levels of 10^7 CFU/ml by the fourth day of storage, most samples spoiled by day 7, and 67% of samples were spoiled by 14 days. When the post pasteurization microflora were assumed to be composed entirely of mesophilic organisms, significant spoilage began by day 3, most samples spoiled by day 10, and 40% of the pasteurized milk samples spoiled within 14 days.

Simulating changes

The effects of various changes to the simulation parameters are shown in Table 2. As noted previously, under the initial simulation conditions (representing the conditions when the problem first arose), 67% of the samples containing psychrotrophs had spoiled by 14 days, while 39% of the samples containing mesophiles had spoiled by 14 days. Lowering the average storage temperature to 4.4°C dramatically reduced spoilage rate such that only 28% (psychrotrophs) or 10% (mesophiles) of samples were spoiled by 14 days.

In addition to storage temperature, the initial number of spoilage microorganisms present in pasteurized milk has been shown to be a significant factor in shelf life *(10)*. Although this may be true, in this simulation, when the mean initial number of spoilage organisms (in

TABLE 2. Summary of the effect of various simulated interventions on the fraction of milk samples spoiled after 14 days

Simulation conditions	Storage temperature (°C)		Initial concentration (Log_{10} CFU/ml)		Organism type	Fraction spoiled at 14 days
	Mean	Standard deviation	Mean	Standard deviation		
Initial condition	6.5	2	1.0	0.9	Psychrotroph Mesophile	67% 39%
Lower average temperature	4.4	2	1.0	0.9	Psychrotroph Mesophile	28% 10%
Lower average temperature and average initial concentration	4.4	2	0.5	0.9	Psychrotroph Mesophile	23% 8%
Lower average temperature and standard deviation	4.4	1	1.0	0.9	Psychrotroph Mesophile	14% >1%
Further lower average temperature	3.4	2	1.0	0.9	Psychrotroph Mesophile	14% 4%
Lower average temperature, standard deviation and average initial concentration	4.4	1	0.5	0.9	Psychrotroph Mesophile	9% 1%

Log_{10} CFU/ml) was reduced from 1.0 to 0.5 (at 4.4°C), little additional benefit was seen: 23% (psychrotrophs) or 8% (mesophiles) of simulated samples had spoiled by 14 days.

In contrast, the simulation predicts that if stores could reduce the variability in milk storage temperature (in terms of standard deviation) from 2°C to 1°C, only 14% (psychrotrophs) or >1% (mesophiles) of samples would be spoiled by 14 days. A similar benefit could be obtained by reducing storage temperature by an additional 1 degree (to 3.4°C) while leaving the temperature standard deviation unchanged (2°C); in this case, the simulation predicts that 14% (psychrotrophs) or 4% (mesophiles) of samples will spoil by 14 days. Finally, if a lower average temperature (4.4°C), standard deviation (1°C) and average initial concentration of spoilage microorganisms (0.5 log_{10}ml) are all assumed, the simulation predicts that only 9% (psychrotrophs) and 1% (mesophiles) of samples will be spoiled by 14 days.

The effect of this final set of assumptions on the simulation results is shown graphically in Fig. 6. If the microorganisms initially present are all assumed to be mesophiles, spoilage occurs, only sporadically before 14 days. While the simulation still predicts that some samples containing psychrotrophs will spoil before 14 days, the actual incidence will likely be less than this, as many containers of milk will be consumed before their 14 day expiration date.

DISCUSSION

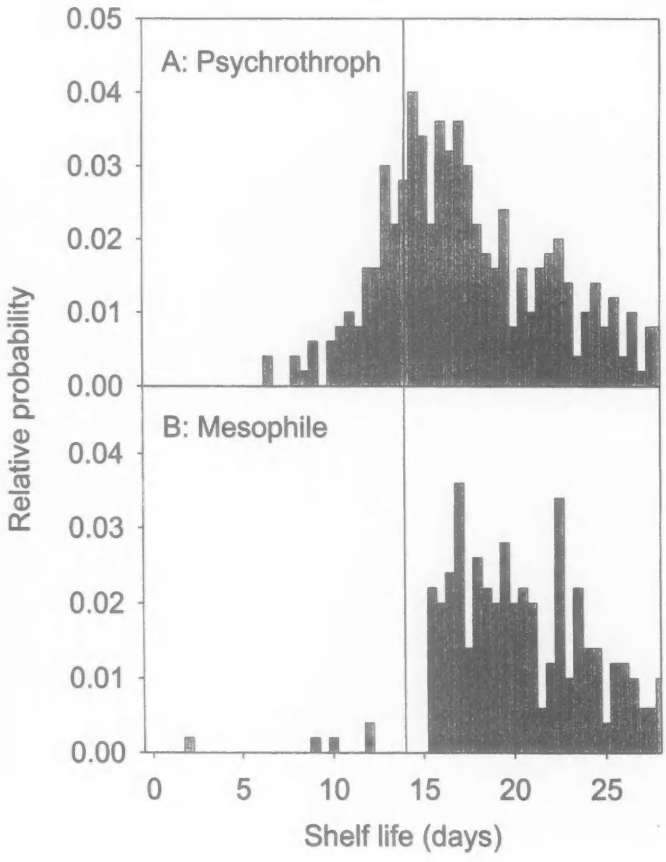
Effect of temperature

Through Monte Carlo simulation, it was shown that lowering the storage temperature by just 2.1°C could have a significant effect on the bacterial spoilage of pasteurized milk, especially of milk contaminated by mesophilic organisms. Drastic shelf-life improvements with slight temperature drops have also been suggersted by Chandler and McMeekin, who predicted (utilizing the square root equation) that lowering the storage temperature of milk 2°C within the range of 0 to 5°C would result in an extended shelf life of approximately 3.5 days. The same temperature drop within the range of 5 to 10°C would increase the shelf life by only 1 day (*5*).

Mesophiles and psychrotrophs

Literature on pasteurized milk spoilage supports the choice of considering both psychrotrophic and mesophilic bacteria. Psychrotrophic bacteria, namely *Pseudomonas*, were shown to comprise 100, 70, and 60% of the spoilage flora in milk samples stored at 6.3, 11.5, and 15.6°C (*4*).

FIGURE 6. Milk shelf-life simulation results assuming: microbes are all psychrotrophs (A) or all mesophiles; (B) in-store milk temperatures with a mean of 4.4°C and a standard deviation of 0.9 Log_{10}/ml. Vertical line at 14 days represents target shelf life



The spoilage flora in milk samples stored at 24.3°C, however, were composed completely of gram-positive mesophilic bacteria. In addition, *Pseudomonas* exhibited the shortest generation times at 0 to 7°C and minimum growth temperatures as low as -10°C. Yet, even though it exhibited longer generation times, *Bacillus* spp. proved to be the predominant microflora at storage temperatures of 10°C (*20*). The T_o values utilized in this model for mesophiles were in good agreement with previous studies. T_o values of -1 and 3°C have been reported for the mesophiles *Proteus morganii* and *Pseudomonas aeruginosa*, repectively (*5*). Yet the T_o values reported for psychrotrophs, -6.9°C (*10*) and -8°C (*5*) were lower than those utilized in this simulation. Simulation results using lower T_o values did not result in large changes in shelf life under different storage and contamination levels (results not shown). Ability of psychrotrophic bacteria to grow at subzero temperatures supports the necessity of controlling post-pasteurization contamination and thus reducing the initial microbial load.

Generation time assumptions

The generation times measured experimentally were longer than that previously reported for natural flora present in pasteurized milk of 6.3 h at 6°C (*10*) but shorter than those reported by Chandler and McMeekin for thermoduric psychrotrophs of 24–30 h at 7°C (*5*). The initial microbial population levels were in good accordance with those reported in the literature. Hayes and Nielson reported initial psychrotrophic populations to be less than 1.4 log/ml (*12*). Initial psychrotrophic bacteria levels were also reported to be less than 1 log by Douglass et al. (*6*). The data utilized here for retail storage temperatures were similar to those temperatures reported on retail units (n = 228), which ranged from 2 to 7°C, with 13.6% of units reaching temperatures ≥ 10°C and 32% at temperatures ≥ 9°C (*19*).

VALIDATION

Even though the assumptions made for this analysis could have influenced the outcomes, shelf-life results were comparable to those of other studies of pasteurized milk. Thirty-two percent of pasteurized milk samples had a shelf life greater than 14 days when stored at 6.1°C, yet 48% of the samples expired earlier (*17*). Meer et al. (*16*) reported that pasteurized milk spoiled after 4 to 10 days when stored at 7°C. Supermarkets and consumers could benefit from a pasteurized milk shelf life 14 days or longer. This condition is not being met for a majority of the milk samples under the current storage temperature of 6.7°C, although reducing the storage temperatures slightly could have a large impact.

SUMMARY

This report has demonstrated how Monte Carlo simulation techniques were used in troubleshooting

a milk spoilage problem and is intended to serve as a useful guide for future studies by the food industry. The Monte Carlo simulation concept can be of value to food processors, and although microbial simulation tools have been used primarily for food safety risk assessment until now, they can also be used to predict microbial spoilage.

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Acceptability of Irradiated Food to Restaurant Managers

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SUMMARY

Restaurant managers in Kansas were surveyed to determine their attitudes toward food irradiation and their willingness to buy and serve irradiated hamburger patties. Results indicate that 54% of restaurants would purchase irradiated ground beef if it were available at the same price as regular product. Only 11% indicated that they would not purchase irradiated product. Females and respondents from restaurants with a policy of cooking ground beef to at least 166°F were less likely to choose irradiation. However, among respondents preferring irradiated to regular ground beef, females valued the process higher than males. Estimated median willingness-to-pay for irradiation for females was 6.25c/lb and for males was 3.94c/lb.

INTRODUCTION

According to widely quoted statistics from the Centers for Disease Control, foodborne pathogens cause approximately 76 million illnesses, 325,000 hospitalizations and 5,000 deaths each year in the United States *(5)*. Public awareness of food safety and concern about the risk of foodborne illness has increased over the past decade. Numerous studies have examined consumers' knowledge, attitudes and perceptions about food safety, their willingness to pay for enhanced food safety, and their willingness to accept new technologies, such as food irradiation, that can enhance food safety. Regarding acceptability of irradiation, results point to an increasing level of acceptance by consumers and the importance of providing accurate information about the process *(1, 10)*.

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However, with American households now spending over 42 cents of every food dollar away from home *(9)*, it is clear that decisions made by food-service and restaurant managers will have an important bearing on the market share for irradiated food. Irradiation can provide important benefits to restaurants both in terms of reducing bacterial contamination in food preparation areas (and consequently reducing the probability of an incident of foodborne illness and the associated costs) and extending the shelf (refrigerator) life of certain products. It is perhaps surprising then that, as far as we are aware, none of the studies examining acceptance of irradiation have targeted restaurant managers.

In this study, we surveyed a sample of restaurant managers regarding their attitude to irradiation and their willingness to purchase and serve irradiated hamburger patties. We focus on hamburgers because of their widespread consumption and, following several well-publicized outbreaks of *E. coli* infection and product recalls involving ground beef, the perceived riskiness of hamburgers in terms of foodborne illness. Hamburgers accounted for approximately 76% of the 7.2 billion beef servings in commercial restaurants in 1999 *(8)*.

METHODS

A list of 697 Kansas restaurants was obtained from the Kansas Restaurant and Hospitality Association. After eliminating establishments where hamburgers were unlikely to be served, such as coffee shops, and pizza places, the survey instrument was mailed to a total of 525 restaurants. After 2 weeks, follow-up questionnaires were mailed to non-respondents, and after an additional 2 weeks, reminder letters were sent to those who still had not responded.

The survey began by assessing the respondent's current l*evel of knowledge about irradiation (from "never heard of" to "know quite a bit about") and attitude (positive, negative, or neutral) toward the process. It then provided some inform*ation about irradiation, including details about its effectiveness in destroying pathogenic bacteria and the fact that irradiation leaves no residue and does not induce radioactivity in the food. In a second version of the survey instrument (Version B), which was mailed to half of the sample, we included additional information about supermarket sales of irradiated hamburgers. Next, the question eliciting the respondent's attitude to irradiation was repeated, followed by a series of questions about whether, and why or why not, the respondent would purchase irradiated hamburger patties for sale in his/her restaurant.

Respondents indicating a willingness to purchase the irradiated patties were then asked a double-bounded discrete choice question to elicit the level of premium they would be willing to pay (WTP) for irradiation. The WTP questions took the following format:

A. Would you pay $1.44 per pound for irradiated hamburger patties if regular patties cost $1.40 per pound?
   ____ **Yes** (Please go to question B)
   ____ **No** (Please go to Question C)

B. Would you pay $1.46 per pound for irradiated hamburger patties if regular patties cost $1.40 per pound?
   ____ **Yes**
   ____ **No**

C. Would you pay $1.42 per pound for irradiated hamburger patties if regular patties cost $1.40 per pound?
   ____ **Yes**
   ____ **No**

To estimate the distribution of WTP values, the price at which irradiated hamburgers were offered in this question varied across respondents. In addition to the set of prices illustrated above (i.e., $1.44, $1.46, and $1.42), we used two additional sets – ($1.46, $1.48, and $1.44) and ($1.48, $1.50, and $1.46) – for different sub-samples of respondents.

Next, the survey provided information about carcass pasteurization, a process used in beef slaughter facilities to reduce bacterial contamination. Respondents were informed that carcass pasteurization would kill over 99% of harmful bacteria but, because the process was carried out at the carcass stage, meat might become re-contaminated, unlike the situation with irradiation which, the information stated, was carried out on final packaged products so that recontamination would not occur before the product reached purchasers. Afer receiving this information, respondents were asked whether they would prefer to purchase hamburger manufactured from pasteurized carcasses or irradiated hamburger if both were available at the same price.

The final questions elicited demographic information about the restaurant and the restaurant manager.

RESULTS

Response rate

From an initial mailing of 525 questionnaires, 106 were returned complete. The second mailing to non-respondents resulted in an additional 43 responses. Following reminder letters, an additional 19 were returned, for a total of 168. Allowing for 18 undelivered questionnaires, the overall response rate was 33%. Of the 168 returned, 150 were complete and useable.

Demographics

The average age of respondents was 48 years, and seventy-five percent were male. Fifty-six percent had a B.S. degree or higher educational level. Seventy-three percent indicated that they owned or were a partner in the restaurant, while twenty-seven percent were managers. The majority of responses, eighty percent, were

TABLE 1. Variable definitions, means, and ordered probit results

Variable	Definition	Mean	Ord. Probit[1]	p-value
Constant			0.52	0.30
Know Irrad	Categorical: 0 = 'never heard of food irradiation,' to 4= 'knew quite a bit about it.'	1.58	0.18	0.19
BS	Education level: 1 = respondent has BS or higher, 0 otherwise	0.56	-0.41	0.08*
Female	1 = female, 0 = male	0.25	-0.37	0.12
Age	Age of the respondent in years	47.8	0.21	0.03**
Medium Well	Ground beef cooking policy: = 1 if always cooked at least med-well	0.41	-0.57	0.01***
Chain	1 = chain restaurant; 0 otherwise	0.21	0.45	0.10*
Sales Info	1 = survey included information about irradiated ground beef sales	0.52	0.14	0.48

[1]Dependent variable = 0 if respondent would not buy irradiated hamburger patties at same price as regular, 1 if not sure, and 2 if would buy irradiated.

* indicates significance at ten percent level.

** indicates significance at five percent level.

*** indicates significance at one percent level.

from independent, as distinct from chain restaurants. Average seating capacity was 136, years in operation was 20, and average sales were between $500,000 and $750,000. Average lunch entree price was between $5.00 and $7.50, while the average price of the dinner entree was between $7.50 and $10.

When asked about the restaurant's policy for serving ground beef, 28% said they cooked it as requested by the customers (even if rare), 26% said they cooked it to at least 160°F (medium) and 41% said they cooked to at least 166°F (medium-well).

Knowledge of and attitude to irradiation

Fifty-eight percent of respondents indicated that they knew at least something about food irradiation prior to the survey, with only 10% indicating that they had never heard about the process. When asked a similar question about carcass pasteurization, only twenty-seven percent said they knew something about it, while forty-nine percent said they had never heard about the process.

Respondents had a generally favorable prior attitude toward food irradiation – 38% positive, 54% neutral, and only 8% negative. After reading the information contained in the survey, respondents had even more favorable attitudes: 73% positive, 21% neutral, and 6% negative. Thus the overall effect of information was to move over 30% of the population from a neutral to a favorable stance. Only two individuals recorded a less favorable attitude to irradiation after reading the information.

Willingness to purchase irradiated hamburgers

Eighty-one respondents (54%) indicated that they would buy irradiated hamburger patties if they were available at the same price as regular patties; fifty-three respondents (35%) said they were not sure, while the remaining sixteen respondents (11%) said they would not buy the irradiated product. Of those sixteen, half had indicated that their personal attitude to food irradiation was negative, but only three believed that irradiated foods were unsafe to eat.

Of eighty-one respondents who would purchase irradiated patties, sixty-six considered the irradiated product to be safer, but only sixteen thought their consumers would prefer it. It is not surprising, then, that only twenty-nine of those respondents (36%) would advertise the fact that they were serving irradiated burgers.

Later in the survey, when asked about their preference between irradiated and "carcass-pasteurized" patties, one hundred two respondents

TABLE 2. Distribution of willingness to pay responses

Initial price	Total N	Yes-Yes*	Yes-No	No-Yes	No-No
$1.44/lb	47	21	8	4	14
$1.46/lb	40	9	3	5	23
$1.48/lb	40	13	2	3	22

*Yes-Yes→ respondent willing to purchase irradiated patties at the initial offer price and at the higher price – i.e., the initial price plus 2c/lb. No-No→ respondent unwilling to purchase irradiated patties at both the initial price and a price 2c/lb below the initial price.

(78%) preferred the irradiated product. Not surprisingly, all sixteen who preferred "regular" patties to irradiated patties also chose "carcass-pasteurized" patties in preference to irradiated patties. For those who preferred irradiated to "regular" (i.e., the 81 respondents referred to above), 86% of them preferred irradiated product over "carcass-pasteurized."

We used an ordered-probit model to investigate relationships between the choice of irradiated hamburger and the respondent's characteristics or characteristics of the respondent's restaurant. We assigned a value of zero to the dependent variable for individuals who would not purchase irradiated product, a value of 1 for those who were unsure, and a value of 2 for those who would. Explanatory variables included the respondent's prior knowledge of irradiation, gender, age, and education level (whether the respondent had a B.S. equivalent or higher), whether the restaurant was a chain or independent, and the restaurant's policy for cooking ground beef (a dummy variable for restaurants with a policy of always cooking ground beef to at least medium-well).

Table 1 presents definitions and summary statistics for the explanatory variable in addition to the estimated ordered probit coefficients. Several studies *(2, 3, 10, 11)* have shown that the more information consumers have about irradiation, the greater the likelihood they will choose irradiated products. Here we find a similar (although not statistically significant) relationship for restaurant managers. The positive coefficient on 'KnowIrrad' suggests that the more knowledgeable respondents are about the process, the more likely they are to choose irradiated product. The coefficient on 'BS' (respondents having a BS degree or higher) is negative and statistically significant at the ten percent level, indicating that the more formal education respondents have, the less likely they are to choose irradiation. However, Fox et al. *(1)* found that individuals with higher levels of education were more likely to be classified as either opponents or proponents of irradiation rather than being neutral on the subject. In view of that finding, the result here is unexpected.

The coefficient on 'female' is negative and close to being statistically significant at the 10% level. Studies have typically found that female consumers are less accepting of the irradiation process *(2, 3, 11)*. This gender effect would seem to apply also to restaurant managers. Consumer studies have generally not found a consistent effect associated with age, but in this group older respondents were significantly more likely to choose irradiated product.

Restaurants with a policy of cooking ground beef to at least medium-well doneness (166°F) were less likely to choose irradiated product. This is not surprising, because irradiation would presumably provide a greater benefit in terms of risk reduction for restaurants that cook to a lower temperature (medium = 160°F) or to the level requested by the customer. Interestingly, respondents associated with chain restaurants were more likely to indicate that they would purchase irradiated product. The additional information about supermarket sales of irradiated ground beef in one version of the survey (the variable 'SalesInfo') had no impact on responses (see Mulik *(7)* for additional details).

Willingness-to-pay for irradiation

Table 2 summarizes the data from the double-bounded willingness-to-pay question. The first column shows the initial price at which irradiated ground beef was offered, which varied from $1.44/lb to $1.48/lb across three versions of the questionnaire, while the price for regular ground beef was held at $1.40/lb. Depending on the respondent's choice at the initial price, they were directed to a second choice question at a price either 2c/lb lower or higher than the initial price. Thus, given the two-part nature of the question there are, for each respondent, four possible responses: both answers are "yes"; both answers are "no"; a "yes" followed by a "no"; and a "no" followed by a "yes".

With irradiated ground beef priced at $1.44/lb, 29 of 47 respondents (62%) chose the irradiated product. Of those 29 individuals, 21 indi-

TABLE 3. Double bounded logistic regression results

Variable	Definition	Coefficient	t-statistic
Constant (α)		0.353	0.37
KnowIrrad	Categorical: 0 = 'never heard of food irradiation', to 4= 'knew quite a bit about it.'	0.154	0.62
BS	Education level: 1 = respondent has BS or higher, 0 otherwise	-0.154	-0.41
Female	1 = female, 0 = male	0.509	1.29
Age	Age of the respondent in years	0.002	0.12
Medium Well	Ground beef cooking policy: = 1 if always cooked at least med-well	0.305	0.82
Chain	1 = chain restaurant; 0 otherwise	-0.467	-1.05
Sales Info	1 = survey included information about irradiated ground beef sales	0.441	1.22
Offer price (β)		22.04	5.63***

*** indicates significance at the less than 1 percent level.

cated they would be willing to purchase irradiated product at $1.46/lb. At higher initial prices ($1.46 and $1.48/lb), fewer individuals chose the irradiated product.

Hanemann et al. *(4)* described the procedure for estimating a regression model using double-bounded discrete choice data. Briefly, a Yes-Yes response indicates that the respondent's true WTP is above the higher price offered in the second part of the WTP question, a No-No indicates WTP is below the lower price, etc. Individual and restaurant characteristics in addition to the prices being offered are expected to influence the probability of observing a particular type of response (yes-yes, yes-no, etc.) and thus influence WTP. Hanemann et al. describes the derivation of the associated log-likelihood function and how the estimated parameters are used to find median WTP values for the sample. We specified a model using the same set of explanatory variables reported in Table 2 and used the TSP statistical package to estimate the model. Parameter estimates are reported in Table 3.

Only the coefficient on offer price is statistically significant, perhaps reflecting the relatively low number of observations (N = 124). Of the other estimates, it is interesting to note the positive and relatively large coefficient associated with female gender. Although females were less likely to choose irradiated product (Table 2), among those who preferred irradiated to regular product, females had higher WTP. Median WTP was calculated as the intercept parameter, α, divided by the slope parameter, β, in a model where all slope parameters except that on price (B) are set to zero. For females, median WTP for irradiation was estimated at 6.25c/lb; for males, median WTP was 3.94c/lb.

DISCUSSION

We investigated restaurant managers' acceptance of irradiation and their willingness to buy and pay a premium for irradiated hamburger patties. Fifty-four percent of respondents indicated that they would buy irradiated hamburger patties if they were available at the same price as regular patties, while only eleven percent indicated that they would not. Female respondents and those with a college degree were less likely to buy irradiated patties, as were respondents from restaurants with a policy of serving hamburgers cooked to at least medium-well done.

Among respondents preferring irradiated to regular patties, females appeared to place a higher value on irradiation than did males; median willingness to pay was estimated at 6.25c/lb for females and 3.94c/lb for males. These premiums are significantly lower than those typically observed in consumer studies *(2)*. This is not surprising, because presumably ground beef purchases are a much larger component of total outlays for restaurants than for a typical consumer. The average premium observed here is marginally lower than the 6c/lb that Dairy Queen™ franchises in Minnesota are currently re-

ported to pay for irradiated ground beef *(6)*. However, if restaurant customers, like retail consumers, are willing to pay a premium for irradiated products, the gap between consumer valuation and the cost of irradiation suggests a potentially profitable opportunity for the restaurant trade.

Perhaps the most important finding in this study is that it illustrates, as many others have illustrated, both the need for education about irradiation and the positive impact of providing that education. Ten percent of restaurant managers who responded had never heard of irradiation and an additional thirty-two percent had heard of it but didn't know much about it. The information provided about irradiation in the survey, scanty as it was, had the effect of shifting almost a third of respondents from a neutral to a positive attitude toward the process.

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Call for Abstracts

IAFP 2004

The Association's 91st Annual Meeting

August 8–11, 2004

Phoenix, Arizona

General Information

1. Complete the Abstract Submission Form.
2. All presenters must register for the Annual Meeting and assume responsibility for their own transportation, lodging, and registration fees.
3. There is no limit on the number of abstracts registrants may submit. However, presenters must present their presentations.
4. Accepted abstracts will be published in the Program and Abstract Book. Editorial changes will be made to accepted abstracts at the discretion of the Program Committee.
5. Photocopies of the abstract form may be used.
6. Membership in the Association is not required for presenting a paper at IAFP 2004.

Presentation Format

1. Technical — Oral presentations will be scheduled with a maximum of 15 minutes, including a two to four minute discussion. LCD projectors will be available.
2. Poster — Freestanding boards will be provided for presenting posters. Poster presentation surface area is 4′ high by 8′ wide. Handouts may be used, but audiovisual equipment will not be available. The presenter will be responsible for bringing pins and velcro.

Note: The Program Committee will make the final decision on presentation format.

Instructions for Preparing Abstracts

1. Title — The title should be short but descriptive. The first letter in each word in the title and proper nouns should be capitalized.
2. Authors — List all authors using the following style: first name followed by the surname.
3. Presenter Name & Title — List the full name and title of the person who will present the paper.
4. Presenter Address — List the name of the department, institution and full postal address (including zip/postal code and country).
5. Phone Number — List the phone number, including area, country, and city codes of the presenter.
6. Fax Number — List the fax number, including area, country, and city codes of the presenter.
7. E-mail — List the E-mail address for the presenter.
8. Format preferred — Check the box to indicate oral or poster format. The Program Committee makes the final decision on the format of the abstract.
9. Category — Check the box to indicate which category best fits the subject of the abstract.
10. Developing Scientist Awards Competitions — Check the box to indicate if the paper is to be presented by a student in this competition. A signature and date is required from the major professor or department head. See "Call for Entrants in the Developing Scientist Awards Competitions."
11. Abstract — Type abstract, double-spaced, in the space provided or on a separate sheet of paper, using a 12-point font size. Use no more than 250 words.

Abstract Submission

Abstracts submitted for IAFP 2004 will be evaluated for acceptance by the Program Committee. Please be sure to follow the format instructions above carefully; failure to do so may result in rejection. Information in the abstract data must not have been previously published in a copyrighted journal.

Abstracts must be received no later than January 5, 2004. Return the completed abstract form through one of the following methods:

1. Online: Use the online abstract submission form located at www.foodprotection.org. You will receive an E-mail confirming receipt of your submission.
2. E-mail: Submit via E-mail as an attached text or MS Word™ document to abstracts@foodprotection.org.

Selection Criteria

1. Abstracts must accurately and briefly describe:
   (a) the problem studied and/or objectives;
   (b) methodology;
   (c) essential results; and
   (d) conclusions and/or significant implications.
2. Abstracts must report the results of original research pertinent to the subject matter. Papers should report the results of applied research on: food, dairy and environmental sanitation; foodborne pathogens; food and dairy microbiology; food and dairy engineering; food and dairy chemistry; food additives and residues; food and dairy technology; food service and food administration; quality assurance/control; mastitis; environmental health; waste management and water quality. Papers may also report subject matter of an educational and/or nontechnical nature.
3. Research must be based on accepted scientific practices.
4. Research should not have been previously presented nor intended for presentation at another scientific meeting. Papers should not appear in print prior to the Annual Meeting.
5. Results should be summarized. Do not use tables or graphs.

Rejection Reasons

1. Abstract was not prepared according to the "Instructions for Preparing Abstracts."
2. Abstract does not contain essential elements as described in "Selection Criteria."
3. Abstract reports inappropriate or unacceptable subject matter or is not based on accepted scientific practices, or the quality of the research or scientific approach is inadequate.
4. Work reported appears to be incomplete and/or data are not presented. Indication that data will be presented is not acceptable.
5. Abstract was poorly written or prepared. This includes spelling and grammatical errors.
6. Results have been presented/published previously.
7. Abstract was received after the deadline for submission.
8. Abstract contains information that is in violation of the International Association for Food Protection Policy on Commercialism.

Projected Deadlines/Notification

Abstract Submission Deadline: January 5, 2004. Submission Confirmations: On or before January 6, 2004. Acceptance/Rejection Notification: February 13, 2004.

Contact Information

Questions regarding abstract submission can be directed to Bev Brannen, 515.276.3344 or 800.369.6337; E-mail: bbrannen@foodprotection.org.

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Abstract Form

DEADLINE: Must be Received by January 5, 2004

(1) Title of Paper _____

_____

(2) Authors _____

_____

(3) Full Name and Title of Presenter _____

_____

(4) Institution and Address of Presenter _____

_____

(5) Phone Number _____

(6) Fax Number _____

(7) E-mail _____

(8) Format preferred: ☐ Oral ☐ Poster ☐ No Preference

The Program Committee will make the final decision on presentation format.

(9) Category: ☐ Produce ☐ Foods of Animal Origin ☐ Seafood ☐ Other Food Commodities

☐ Risk Assessment ☐ Education ☐ General Microbiology and Sanitation

☐ Antimicrobials ☐ Pathogens

(10) Developing Scientist Awards Competition ☐ Yes Graduation date _____

Major Professor/Department Head approval (signature and date) _____

(11) TYPE abstract, DOUBLE-SPACED, in the space provided or on a separate sheet of paper, using a 12-point font size. Use no more than 250 words.

Call for Entrants in the Developing Scientist Awards Competitions

Supported by the International Association for Food Protection Foundation

The International Association for Food Protection is pleased to announce the continuation of its program to encourage and recognize the work of students and recent graduates in the field of food safety research. Qualified individuals may enter either the oral or poster competition.

Purpose

1. To encourage students and recent graduates to present their original research at the Annual Meeting.
2. To foster professionalism in students and recent graduates through contact with peers and professional Members of the Association.
3. To encourage participation by students and recent graduates in the Association and the Annual Meeting.

Presentation Format

Oral Competition – The Developing Scientist Oral Awards Competition is open to graduate students (enrolled or recent graduates) from M.S. or Ph.D. programs or undergraduate students at accredited univesities or colleges. Presentations are limited to 15 minutes, which includes two to four minutes for discussion.

Poster Competition – The Developing Scientist Poster Awards Competition is open to students (enrolled or recent graduates) from undergraduate or graduate programs at accredited universities or colleges. The presenter must be present to answer questions for a specified time (approximately two hours) during the assigned session. Specific requirements for presentations will be provided at a later date.

General Information

1. Competition entrants cannot have graduated more than a year prior to the deadline for submitting abstracts.
2. Accredited universities or colleges must deal with environmental, food or dairy sanitation, protection or safety research.
3. The work must represent original research completed and presented by the entrant.
4. Entrants may enter only one paper in either the oral or poster competition.
5. All entrants must register for the Annual Meeting and assume responsibility for their own transportation, lodging, and registration fees.
6. Acceptance of your abstract for presentation is independent of acceptance as a competition finalist. Competition entrants who are chosen as finalists will be notified of their status by the chairperson by May 28, 2004.
7. All entrants with accepted abstracts will receive a complimentary, one-year Student Membership. This membership will entitle you to receive *JFP* Online.
8. In addition to adhering to the instruction in the "Call for Abstracts," competition entrants must check the box to indicate if the paper is to be presented by a student in this competition. A signature and date is required from the major professor or department head.

Judging Criteria

A panel of judges will evaluate abstracts and presentations. Selection of up to five finalists for each competition will be based on evaluations of the abstracts and the scientific quality of the work. All entrants will be advised of the results by May 28, 2004. Only competition finalists will be judged at the Annual Meeting and will be eligible for the awards.

All other entrants with accepted abstracts will be expected to be present as part of the regular Annual Meeting. Their presentations will not be judged and they will not be eligible for the awards.

Judging criteria will be based on the following:

1. Abstract – clarity, comprehensiveness and conciseness.
2. Scientific Quality – Adequacy of experimental design (methodology, replication, controls), extent to which objectives were met, difficulty and thoroughness of research, validity of conclusions based upon data, technical merit and contribution to science.
3. Presentation – Organization (clarity of introduction, objectives, methods, results and conclusions), quality of visuals, quality and poise of presentation, answering questions, and knowledge of subject.

Finalists

Awards will be presented at the International Association for Food Protection Annual Meeting Awards Banquet to the top three presenters (first, second and third places) in both the oral and poster competitions. All finalists are expected to be present at the banquet where the awards winners will be announced and recognized.

Awards

First Place – $500 and an engraved plaque
Second Place – $ 300 and a framed certificate
Third Place – $100 and a framed certificate

Award winners will receive a complimentary, one-year Student Membership including *Food Protection Trends*, *Journal of Food Protection*, and *JFP* Online.

Policy on Commercialism

for Annual Meeting Presentations

1. INTRODUCTION

No printed media, technical sessions, symposia, posters, seminars, short courses, and/or other related types of forums and discussions offered under the auspices of the International Association for Food Protection (hereafter referred to as to Association forums) are to be used as platforms for commercial sales or presentations by authors and/or presenters (hereafter referred to as authors) without the express permission of the staff or Executive Board. The Association enforces this policy in order to restrict commercialism in technical manuscripts, graphics, oral presentations, poster presentations, panel discussions, symposia papers, and all other type submissions and presentations (hereafter referred to as submissions and presentations), so that scientific merit is not diluted by proprietary secrecy.

Excessive use of brand names, product names or logos, failure to substantiate performance claims, and failure to objectively discuss alternative methods, processes, and equipment are indicators of sales pitches. Restricting commercialism benefits both the authors and recipients of submissions and presentations.

This policy has been written to serve as the basis for identifying commercialism in submissions and presentations prepared for the Association forums.

2. TECHNICAL CONTENT OF SUBMISSIONS AND PRESENTATIONS

2.1 Original Work

The presentation of new technical information is to be encouraged. In addition to the commercialism evaluation, all submissions and presentations will be individually evaluated by the Program Committee chairperson, technical reviewers selected by the Program Committee chairperson, session convenor, and/or staff on the basis of originality before inclusion in the program.

2.2 Substantiating Data

Submissions and presentations should present technical conclusions derived from technical data. If products or services are described, all reported capabilities, features or benefits, and performance parameters must be substantiated by data or by an acceptable explanation as to why the data are unavailable (e.g., incomplete, not collected, etc.) and, if it will become available, when. The explanation for unavailable data will be considered by the Program Committee chairperson and/or technical reviewers selected by the Program Committee chairperson to ascertain if the presentation is acceptable without the data. Serious consideration should be given to withholding submissions and presentations until the data are available, as only those conclusions that might be reasonably drawn from the data may be presented. Claims of benefit and/or technical conclusions not supported by the presented data are prohibited.

2.3 Trade Names

Excessive use of brand names, product names, trade names, and/or trademarks is forbidden. A general guideline is to use proprietary names once and thereafter to use generic descriptors or neutral designations. Where this would make the submission or presentation significantly more difficult to understand, the Program Committee chairperson, technical reviewers selected by the Program Committee chairperson, session convenor, and/or staff, will judge whether the use of trade names, etc., is necessary and acceptable.

2.4 "Industry Practice" Statements

It may be useful to report the extent of application of technologies, products, or services; however, such statements should review the extent of application of all generically similar technologies, products, or services in the field. Specific commercial installations may be cited to the extent that their data are discussed in the submission or presentation.

2.5 Ranking

Although general comparisons of products and services are prohibited, specific generic comparisons that are substantiated by the reported data are allowed.

2.6 Proprietary Information (See also 2.2.)

Some information about products or services may not be publishable because it is proprietary to the author's agency or company or to the user. However, the scientific principles and validation of performance parameters must be described for such products or services. Conclusions and/or comparisons may be made only on the basis of reported data.

2.7 Capabilities

Discussion of corporate capabilities or experiences are prohibited unless they pertain to the specific presented data.

3. GRAPHICS

3.1 Purpose

Slides, photographs, videos, illustrations, art work, and any other type visual aids appearing with the printed text in submissions or used in presentations (hereafter referred to as graphics) should be included only to clarify technical points. Graphics which primarily promote a product or service will not be allowed. (See also 4.6.)

3.2 Source

Graphics should relate specifically to the technical presentation. General graphics regularly shown in, or intended for, sales presentations cannot be used.

3.3 Company Identification

Names or logos of agencies or companies supplying goods or services must not be the focal point of the slide. Names or logos may be shown on each slide so long as they are not distracting from the overall presentation.

3.4 Copies

Graphics that are not included in the preprint may be shown during the presentation only if they have been reviewed in advance by the Program Committee chairperson, session convenor, and/or staff, and have been determined to comply with this policy. Copies of these additional graphics must be available from the author on request by individual attendees. It is the responsibility of the session convenor to verify that all graphics to be shown have been cleared by Program Committee chairperson, session convenor, staff, or other reviewers designated by the Program Committee chairperson.

4. INTERPRETATION AND ENFORCEMENT

4.1 Distribution

This policy will be sent to all authors of submissions and presentations in the Association forums.

4.2 Assessment Process

Reviewers of submissions and presentations will accept only those that comply with this policy. Drafts of submissions and presentations will be reviewed for commercialism concurrently by both staff and technical reviewers selected by the Program Committee chairperson. All reviewer comments shall be sent to and coordinated by either the Program Committee chairperson or the designated staff. If any submissions are found to violate this policy, authors will be informed and invited to resubmit their materials in revised form before the designated deadline.

4.3 Author Awareness

In addition to receiving a printed copy of this policy, all authors presenting in a forum will be reminded of this policy by the Program Committee chairperson, their session convenor, or the staff, whichever is appropriate.

4.4 Monitoring

Session convenors are responsible for ensuring that presentations comply with this policy. If it is determined by the session convenor that a violation or violations have occurred or are occurring, he or she will publicly request that the author immediately discontinue any and all presentations (oral, visual, audio, etc.) and will notify the Program Committee chairperson and staff of the action taken.

4.5 Enforcement

While technical reviewers, session convenors, and/or staff may all check submissions and presentations for commercialism, ultimately it is the responsibility of the Program Committee chairperson to enforce this policy through the session convenors and staff.

4.6 Penalties

If the author of a submission or presentation violates this policy, the Program Committee chairperson will notify the author and the author's agency or company of the violation in writing. If an additional violation or violations occur after a written warning has been issued to an author and his agency or company, the Association reserves the right to ban the author and the author's agency or company from making presentations in the Association forums for a period of up to two (2) years following the violation or violations.

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Highlights of the Executive Board Meeting October 2, 2003

Following is an unofficial summary of actions from the Executive Board Meeting held by teleconference on October 2, 2003:

Approved the following:

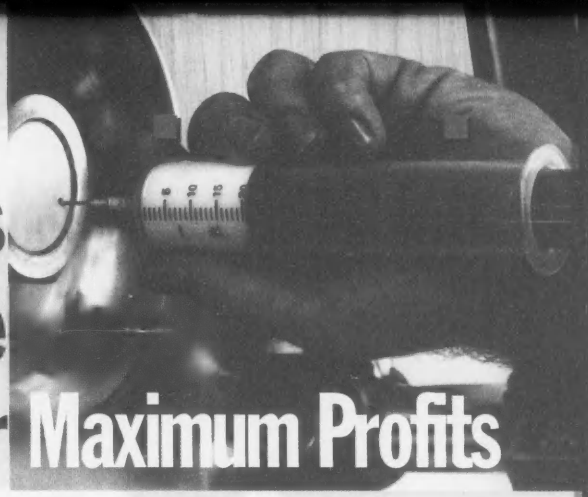
- Minutes of August 8-14, 2003 Executive Board Meeting

Discussed the following:

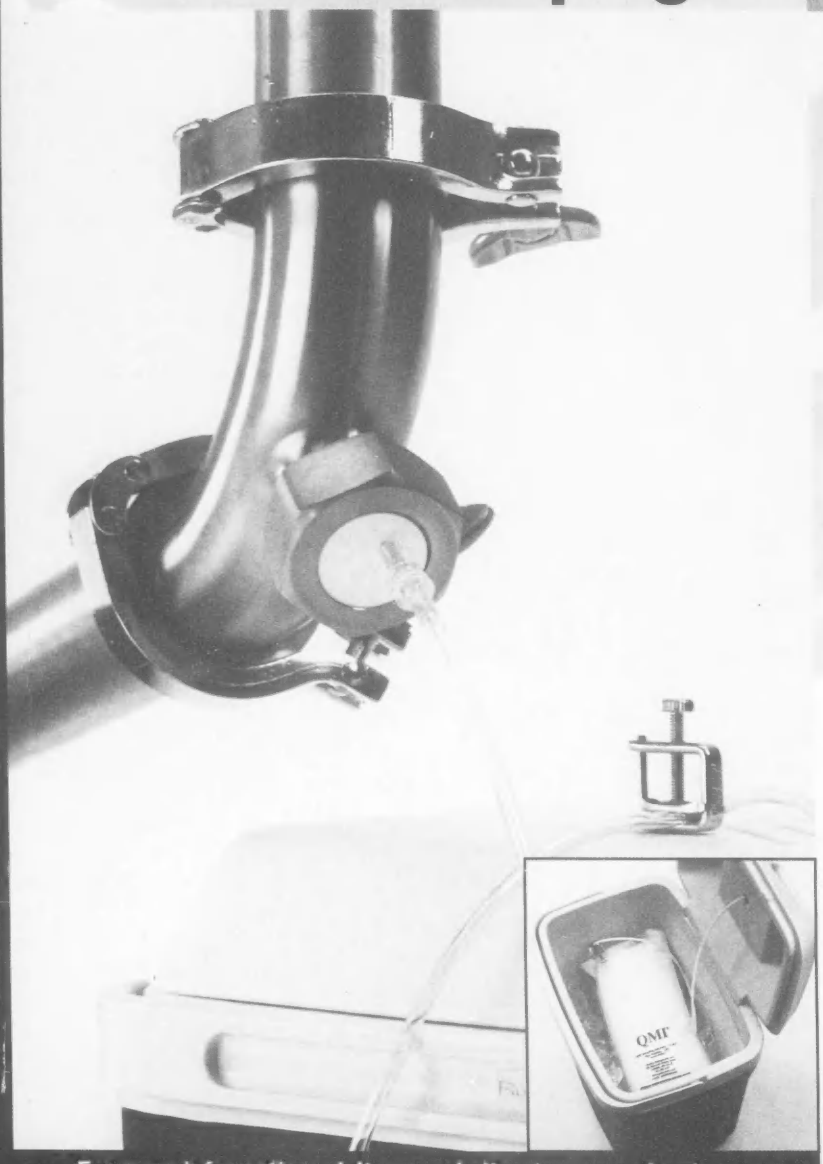
- E-mail votes taken since the last meeting
- July financial statements reviewed and compared to budget
- Audit status for August 31, 2003 year end-audit scheduled for October 14
- IAFP Officers made presentations at two Affiliate meetings. Five presentations are scheduled through fall
- Date presented to be included on Affiliate Awards given at Annual Meeting
- Affiliate educational session sponsorship
- Potential new Affiliate organizations — Vermont, Japan, New Zealand, South Africa, United Arab Emirates, Japan, Arkansas
- Committee recommendations and Board response
- Annual Meeting — non-presentation policy
- *FPT* article 03-18
- IAFP 2003 — attendee and exhibitor evaluation results
- IAFP 2003 Workshop evaluation results
- IAFP 2004 — Planning and program report
- Off-site workshop proposals
- NSF Food safety leadership awards
- IAFP staff retirement plan contribution

Next Executive Board meeting: January 18, 2004

Today's Dairy Farmers Require Accurate Milk Sampling For Maximum Profits



Staphylococcus aureus



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- Precise composite sampling to aid in mastitis control
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Escherichia coli

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For more information, visit our website at www.qmisystems.com or the University of Minnesota website at http://mastitislab.tripod.com/index.htm

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UPDATES

Richard Ennis Named Vice President, Food Safety Division, at Steritech

The Steritech Group, Inc., a provider of food safety related services, has appointed Richard Ennis, vice president of the company's food safety division.

Ennis, who brings 15 years of marketing and operations experience in the hygiene products and services sector to the business, will be based in Steritech's corporate office in Charlotte, NC. Ennis was previously marketing director of Kimberly-Clark Corporation's business-to-business washroom division, managing both the Kleenex® and Scott® towel brands.

In his new role, Ennis will oversee day-to-day operations of Steritech's food safety business, managing an extensive array of clients including some of the most well-known names in the food service and hospitality industries. In addition to operations management responsibilities, which include financial management, planning and logistics for the company's field operations, Ennis will focus on corporate marketing.

Ennis holds a B.S. in mechanical engineering from the University of Ottawa and an M.B.A. from the American Graduate School of International Management, Phoenix, AZ.

Margaret O'K. Glavin Appointed FDA's Assistant Commissioner for Counter-terrorism

Commissioner of Food and Drugs Mark B. McClellan, M.D., Ph.D., has announced the appointment of Margaret O'K. Glavin as FDA's new assistant commissioner for counter-terrorism. Ms. Glavin is a nationally recognized food safety policy expert, who was most recently a visiting scholar at Resources for the Future, a prominent think tank on environmental and natural resources.

As the new assistant commissioner, Ms. Glavin will be the senior counter-terrorism advisor to Dr. McClellan, and will supervise FDA's Office of Counter-terrorism Policy. In this role she will provide executive-level policy and program direction for FDA's counter-terrorism-related strategic, legislative and inter-agency activities.

From 1968 to 2002, Ms. Glavin has held a number of positions in the US Department of Agriculture culminating in her being named acting administrator of the Food Safety and Inspection Service.

A graduate of Trinity College and Georgetown University, Ms. Glavin has published articles in various publications, including *Food and Agriculture 2003*, *SAIS Review*, and *Food and Drug Law Journal*.

Chr. Hansen Appoints Three in Mexico

Alfonso Lomeli is appointed director of administration and finance for the company's Mexico facility. Mr. Lomeli is a certified public accountant by the National Autonomous University of Mexico, with training in corporate finance, auditing, taxes, budget and forecasting, cost accounting, treasury and supervision of information technology.

Jose Oviedo joins Chr. Hansen as flavors business development manager in Mexico. Mr. Oviedo holds a biochemical engineering degree from the Technological Institute of Superior Studies of Monterrey, and a masters degree in institution management from Iowa State University.

Gustavo Pimentel joins Chr. Hansen as colors business development manager in Mexico. Mr. Pimentel holds a degree in biochemical engineering and a masters degree in food technology from the National School of Biological Sciences in the National Polytechnical Institute in Mexico City.

Control Products, Inc. Names Paul Carlson Vice President of Operations

Control Products, Inc., welcomes Paul Carlson to its management team as vice president of operations. Paul's focus will be to support the growth and advancement of Control Products through continued development of operation's personnel, improved manufacturing processes and quality customer support.

Prior to joining Control Products, Paul worked for IMI Cornelius, Coca-Cola and Trane Company in the areas of engineering, product, and equipment management. Most recently, he was vice president of business management at IMI Cornelius where he was responsible for providing marketing and engineering direction for several commercial beverage equipment product lines.

American Association of Cereal Chemists Installs New Board

The American Association of Cereal Chemists (AACC) is pleased to announce the newly elected officials for 2003–2004.

George Lookhart, new AACC president-elect, is a research chemist with the US Department of Agriculture's Agricultural Research Service at the Grain Marketing and Production Research Center (GMPRC) in Manhattan, KS.

Khalil Khan, new AACC director, is a professor in the Department of Cereal and Food Sciences at North Dakota State University, Fargo, ND.

Filip Arnaut, newly appointed AACC director, is a group long term research director of the Puratos Group, a bakery ingredients company. In this function he has a strong focus on promoting collaborative research with universities, research centers, clients, and suppliers.

Sakharam Patil, newly appointed AACC director, spent 24 years at American Maize/Cerestar in various positions before his retirement in 2002. His most recent position was vice president of technology transfer and quality.

James Dexter, a senior research scientist at the Canadian Grain Commission Grain Research Laboratory (GRL) in Winnipeg, MB, Canada began his term as AACC president on October 3, 2003.

Other members of the 2003–2004 board include: Brendan Donnelly, chair of the board; Elizabeth Knight, treasurer; Larry Johnson, director; Virgil Smail, director; and Alicia DeFrancisco, international director.

Langen Named IFT Science Information Manager

The Institute of Food Technologists has hired Sara E. Langen as its new science information manager, in charge of coordinating editorial content and design of IFT's scientific documents.

Langen most recently was assistant editor of *Food Technology* magazine, IFT's flagship monthly publication providing news and analysis of the development, use, quality, safety, and regulation of food sources, products, and processes.

IFT scientific documents which Langen will oversee production of include expert panel reports, scientific status summaries, white papers and other timely documents relating to important and emerging topics in food science and technology.

Langen brings sound expertise in communicating scientific and technical information to specialists and non-scientific audiences alike. She holds a bachelor's degree in journalism from Indiana University. Before joining IFT, Langen was a reporter with *The Smithfield Herald* in North Carolina.

International Association for Food Protection® NEWS

Farms are Next Food Safety Frontier, Says CSPI

Many government agencies monitor food, but no federal agency is in charge of food-safety practices on America's farms, according to the nonprofit Center for Science in the Public Interest (CSPI), which has urged the Administration and Congress to make one agency responsible for improving food-safety practices on the farm, where harmful pathogens can contaminate livestock, fruit, and vegetables.

"No government agency has the responsibility for improving food safety on the farm," said Caroline Smith DeWaal, food-safety director for CSPI. "Food-safety practices have to start where food itself starts — on farms. But even though new farming technologies could make for safer food, the government does little to get farmers and ranchers to use them." Food-safety responsibilities are split between the Food and Drug Administration (FDA) — part of the Department of Health and Human Services (HHS) — and the Department of Agriculture (USDA). The resulting regulatory gaps are most evident on farms, says CSPI, where better regulation is most urgently needed. For instance, while USDA regulates chickens, the FDA regulates eggs. But neither agency monitors or regulates on-farm practices that might reduce the risk of *Salmonella* in eggs.

In the letter to Agriculture Secretary, Ann Veneman and Health and Human Services Secretary, Tommy Thompson, CSPI also urged the Administration to commission a National Academy of Sciences' (NAS) study of new on-farm safety methods. In 1990, Congress directed USDA to commission the NAS to study of animal care and disease prevention strategies, but USDA refused to fund it. Adopt new regulations to reduce the incidence of *Salmonella* in eggs. Such regulations have been pending since 2000 but haven't been adopted, despite widespread support.

Increase federal research to develop on-farm approaches like competitive exclusion, immunizations, bacteriophages, sanitation strategies, and improved transportation.

Existing research already shows how modifying animal diets, reducing animal stress, and improving on-farm hygiene may reduce contamination. For instance, grass feeding or feed additives may be able to inhibit *E. coli* O157:H7 in beef cattle, says CSPI. And not using untreated manure to fertilize fields can lower the risk of contaminated produce.

"A growing number of food poisoning outbreaks are linked to fresh fruits and vegetables, many of which carry the same hazards that are linked to animals," DeWaal said. "Better controls on the farm are urgently needed if we are to reverse this trend."

New Online Tool for Food Law Enforcers

A new Web site portal to support the UK's food law enforcers has been launched by the Food Standards Agency. The new portal includes quick links to food hazard warnings and local authority audit reports, enforcement data, as well as all the latest news.

David Statham, the Food Standards Agency's director of enforcement and food standards, said, "We hope that this portal will make it much easier for enforcers to find whatever it is they need in the click of a mouse. We will be bringing more information and services online as it becomes available, and we're really keen to hear from users about any suggestions they have for improving the service."

To view the portal, go to: http://www.foodstandards.gov.uk/enforcement/.

North and South Survey Reveals 8,800 New Cases of Gastroenteritis Every Day

A new study, "Acute Gastroenteritis in Ireland, North and South" has revealed that there may be 8,800 episodes of acute gastroenteritis North and South every day. The telephone survey of almost 10,000 households was carried out over 12 months and found that in any four-week period 4.5% of the population will have an episode of acute gastroenteritis. If extrapolated to the entire population this means there are approximately 3.2 million episodes of acute gastroenteritis each year.

The study, jointly carried out by the Communicable Disease Surveillance Centre – Northern Ireland, the Department of Public Health Medicine and Epidemiology – University College Dublin, the Food Safety Authority of Ireland, the Food Safety Promotion Board, the Food Standards Agency – Northern Ireland, and the National

Disease Surveillance Centre — found that for every 10 people in the population, six will have an episode of gastroenteritis per year. Each episode averages four days.

Commenting on the study, which is the first to be carried out in Ireland North and South, NDSC specialist in public health medicine, Dr. Derval Igoe, said that the study examined the scale and magnitude of the problem by looking at the level of illness in the community rather than solely at the point where individuals made contact with the health services. "Acute gastroenteritis is a common but frequently preventable illness that most people have experienced. It is underreported because most people do not seek medical help for their symptoms, which can include diarrhea, vomiting, or a combination of both, abdominal pain, cramps, and fever. The mainstay of treatment is fluid replacement, and attention to hygiene to prevent spread to others," said Dr. Igoe.

Acute gastroenteritis is a common and important public health problem with significant economic cost. It was estimated in 17% of episodes, the ill person or a family member had to take time off work due to their own, or their child's illness. Nineteen percent had to take time off school or college. Approximately 1.5 million working days are lost each year in Ireland, North and South due to acute gastroenteritis with €173.5 million or £114 million sterling in lost earnings alone.

The research group recommend that by implementing simple measures like proper hand washing and following the rules of safe food preparation, the burden of illness can be reduced. The survey findings will be used to inform policy on public health, leading to better planning for the prevention, surveillance and control of acute gastroenteritis.

"Desktop Dining" Trend Demands New Office Eating Etiquette

For many working Americans, eating a meal is just another task to juggle during a busy workday of e-mails, phone calls, meetings and deadlines. And as more employees opt to multi-task their way through breakfast, lunch and even dinner, "desktop dining" has quickly become a mainstay of corporate culture.

According to a new survey by the American Dietetic Association and ConAgra Foods, a majority of Americans eat lunch (67 percent) and snack throughout the day (61 percent) at their desks, while more than one out of three typically find breakfast the first task on their workplace to-do list. And office demands are winning out over dining ambience for the small percentage (10 percent of men, seven percent of women) who dine desktop for dinner, as well.

"In many cases, desktops have replaced kitchen tables as the primary place to eat meals, but that doesn't mean we should allow bacteria to work overtime," says Carolyn O'Neil, registered dietitian and national spokesperson for ADA/ConAgra Food's Home Food Safety ... It's in Your Hands® program. "It's important that your mealtime multi-tasking also includes practicing proper food safety techniques."

Fridge Faux Pas: The traditional lunch hour may be a thing of the past, but when it comes to protecting themselves against foodborne illnesses, many professionals are still "out to lunch." According to the ADA/Con-Agra Foods survey, the most popular brown bag options for working Americans include meat and cheese sandwiches (69 percent), leftovers (64 percent) and salads (37 percent) — all of which can spoil if not properly refrigerated.

Yet, survey results show that nearly 30 percent of Americans who bring their lunch to work don't store them in the office refrigerator. And of those, more than four out of five typically leave their lunch unrefrigerated for more than three hours before eating — which means foods may be spoiled even before the first bite. "Perishable foods should never sit out for more than two hours. At that point, bacteria begin to multiply rapidly, increasing your risk of food poisoning," says O'Neil.

Office Eating Etiquette: The same food safety rules also apply to shared foods. From staff birthday celebrations to post-meeting leftovers, these community treats are an office staple — but they can also be dangerous business if perishable foods are not properly refrigerated.

According to the ADA/Con-Agra Foods survey, foods are left around the office to share at least once a week in nearly 70 percent of offices. In most of these cases (68 percent), shared foods sit out for more than two hours or until they're finished — with more than three out of five Americans saying they feel comfortable eating it. "Our hectic work schedules may have changed the way we eat, but the basic rules of food safety are still the same. As kitchens continue to extend beyond the home and into the office, Americans need to re-think their desktop dining habits and make sure proper office eating etiquette is on their daily to-do list," says O'Neil.

Food Safety To-dos for the Desktop Diner: Give bacteria the pink slip by following proper food safety tips from ADA and ConAgra Foods: Wash hands before and after digging into your desktop dish. If you can't get to a restroom to wash hands with soap and water, keep moist towelettes or an anti-bacterial hand cleaner at your desk.

From the time you make your lunch at home — assuming it contains perishable food items, as many brown bags do — don't let more than two hours pass before you put it in the refrigerator. Also, don't let lunchtime leftovers remain unrefrigerated for more than two hours.

Keep perishable foods properly refrigerated below 40°F. Not sure what the temperature in the office fridge is? Do yourself and your co-workers a favor by bringing in a refrigerator thermometer from home to keep track.

Thaw frozen foods in the refrigerator or microwave, not on the countertop. If you bring leftovers for lunch, re-heat them to the proper temperature of 165°F. Don't forget that the same food safety tips apply to carry-out and fast food, which also can be susceptible to bacteria if not handled properly.

The ADA/ConAgra Foods Home Food Safety… It's in Your Hands® program educates consumers that home food safety is a serious issue and provides solutions so Americans can easily and safely handle food in their own kitchens. This program complements government-sponsored food safety initiatives that speak to the leading critical food-handling violations by emphasizing the following four key messages: (1) Wash hands often; (2) Keep raw meats and ready-to-eat foods separate; (3) Cook to proper temperatures; (4) Refrigerate promptly below 40°F.

For more information, visit www.homefoodsafety.org.

HHS Issues New Rules to Enhance Security of the US Food Supply

HHS Secretary Tommy G. Thompson has announced the issuance of two Food and Drug Administration regulations that will bolster the safety and security of America's food supply. The new regulations will enable better targeted efforts to monitor and inspect imported foods and will allow quick identification and notification of food processors and other establishments involved in any deliberate or accidental contamination of food.

"By requiring advance notice for imported food shipments and registering domestic and foreign food facilities, we are providing critical new tools for the FDA to identify potentially dangerous foods and better keep our food supply safe and secure," Secretary Thompson said. "These new requirements represent the latest steps in our ongoing efforts to respond to new threats and improve the safety of all the foods that we eat in this country."

The two new regulations will implement key provisions of the Public Health Security and Bioterrorism Preparedness and Response Act of 2002, which provided FDA new authority to protect the nation's food supply against actual or threatened terrorist acts and other food-related emergencies. "With input from the private sector, our partners in the federal government and the governments of our trading partners, we will use these regulations to work more effectively than ever to protect America's food supply, while maintaining the regular, free flow of commerce that is so vital to the well being of our citizens. Coupled with other counter-terrorism initiatives, these regulations mark a new era of international collaboration, one that strengthens the free market and free trade even as we face new threats to our security. We will keep working to build on these important regulations to fulfill our mission of helping Americans get diverse, affordable food products that are as safe and secure as possible," said FDA Commissioner Mark B. McClellan, M.D., Ph.D.

The first regulation requires food importers to provide the FDA with advance notice of human and animal food shipments imported or offered for import on or after Dec. 12, 2003. This will allow FDA to know, in advance, when specific food shipments will be arriving at US ports of entry and what those shipments will contain. This advance information will allow the FDA, working with US Customs and Border Protection (CBP), to more effectively target inspections and ensure the safety of imported foods. The FDA expects to receive about 25,000 notifications about incoming shipments each day.

The second regulation requires domestic and foreign food facilities that manufacture, process, pack or hold food for human or animal consumption in the United States to register with the agency by Dec. 12, 2003. As a result, FDA will have for the first time a complete roster of foreign and domestic food facilities. The requirements will enable the FDA to quickly identify and locate affected food processors and other establishments in the event of deliberate or accidental contamina-

tion of food. The FDA expects about 420,000 facilities to register under this requirement. The FDA worked closely with CBP to ensure the new regulations promote a coordinated strategy for border protection. "Using the electronic data required under these regulations and a sophisticated automated targeting system, CBP and the FDA will be working side-by-side to make joint decisions about food shipments that could pose a potential threat to the United States. This integrated risk-management process will increase our security and facilitate the movement of legitimate commerce — objectives shared by both agencies. We look forward to continuing our work with the FDA to implement the regulations in a manner that meets these shared objectives," said Commissioner Robert C. Bonner, U.S. Customs and Border Protection, Department of Homeland Security.

The regulations reflect comments from a broad array of law enforcement, national security, industry and other experts as the FDA worked to effectively improve food safety and security without adding unnecessary costs to domestic or international trade.

"We have listened carefully to what stakeholders said about the proposals, in order to develop rules that are both workable and feasible. The rules we are announcing are intended to fulfill our goal of making the food supply safer and more secure without hindering trade," said Dr. McClellan.

Under the prior notice regulation, prior notice of imported foods must be received and confirmed electronically by FDA no more than five days before its arrival and no fewer than two hours before arrival by land via road; four hours before arrival by air or by land via rail; or eight hours before arrival by water.

In addition, for international mail shipments, notifications must be made before the shipment is mailed. Also, when an individual carries or otherwise transports foods subject to the new requirement, advance notice of two, four or eight hours is required — depending on the mode of transportation. The food must also be accompanied by confirmation of receipt for FDA review.

The regulation's timeframes reflect the FDA's work, in collaboration with other agencies, to reduce substantially the required time for advance notice to minimize unnecessary costs. For example, the proposed rule issued earlier this year would have required that importers give notice by noon the day before the arrival of a shipment of food into the United States for all modes of transportation, including by land by road. The final regulation requires only two hours notice before arrival of food by land by road and could be reduced further in the future as part of FDA-CBP plan to coordinate border-management activities more efficiently.

The advance notice to the FDA may be submitted electronically in most circumstances using Customs' existing ABI/ACS system, making it easier for importers to comply with the new law. In addition, the FDA will operate a new Prior Notice System Interface that can receive such notifications.

The second regulation requires the owner, operator, or agent in charge of a domestic or foreign food facility to register with FDA, providing information about the name and address of each facility at which, and all trade names under which, the registrant conducts business, and information about certain categories of food the facility produces. For a foreign facility, the registration must include the name of the US agent for the facility.

Registration is required for domestic facilities whether or not food from the facility enters interstate commerce. Domestic facilities are also required to provide emergency contact information. All changes to such information must be reported within 60 days.

Except for specific exemptions, the registration requirements apply to all facilities that manufacture, process, pack or hold food regulated by FDA, including animal feed, dietary supplements, infant formula, beverages (including alcoholic beverages) and food additives. Registration would not be required for private residences of individuals; certain food transport vehicles; facilities that manufacture food contact substances and pesticides; farms; restaurants; other retail food establishments; nonprofit food establishments in which food is prepared for or served directly to the consumer; non-processing fishing vessels; and facilities (such as meat and poultry slaughterhouses) that are regulated exclusively by the US Department of Agriculture. Also exempt are foreign facilities if the food from the facility is to undergo further processing or packaging by another facility before it is exported to the US.

The registration may be submitted electronically, via the Internet, or by paper through surface mail or by fax. Registrations may also be submitted on CD-ROM by mail. The FDA will be able to accept electronic registration from anywhere in the world 24 hours a day, 7 days a week.

Filling out registration online should take about 15 minutes if a facility has its paperwork ready. A registering facility will receive confirmation of electronic registration and its registration number instantaneously once all the required fields on the registration screen are filled in. There is no fee associated with registration.

The rules take effect Dec. 12, 2003, in accordance with the Bioterrorism Act. To assure that the regulations can be implemented efficiently and with minimal disruption, FDA intends to exercise broad enforcement discretion for the prior notice rule for the first four months after implementation. During this time, FDA and CBP will educate importers about how they can comply with the regulations, and will work with trade associations and foreign governments to make sure all importers are well informed of the new requirements. Thereafter, FDA will phase in full implementation of the prior notice requirements.

FDA has already conducted extensive domestic and international outreach and education about the new rules. In the coming weeks, FDA will conduct national and international meetings and other programs to provide full information about the rules. FDA also held a satellite downlink public meeting on Oct. 28 to discuss the two regulations. Information about this meeting, including domestic and international viewing opportunities and registration, is available at http://www.fda.gov/OHRMS/DOCKETS/98fr/03-24921.htm. Both the new regulations were published as interim final rules in the Oct. 10 issue of the Federal Register. The FDA is requesting further public comment on the rules. The regulations are available at http://www.cfsan.fda.gov/.

INDUSTRY PRODUCTS

Thermo Electron Corporation

Thermo Orion Introduces the New AQUAfast® AQ4000 Chemical Oxygen Demand Products for Wastewater and Environmental Measurement

Thermo Orion, a Thermo Electron business in the development and manufacturing of chemical measurement product lines, introduces the new Orion AQUAfast AQ4000 Chemical Oxygen Demand (COD) products.

Thermo Orion has expanded its AQUAfast colorimetry line to include products for the measurement of COD, one of the most common measurements in waste water and environmental applications. This new system for chemical oxygen demand is recognized as being EPA equivalent and follows the method outlined by Standard Methods of Water and Wastewater. The COD product offering includes a reactor to digest up to 25 samples simultaneously in 2 hours or less, pre-measured and ready-to-use COD chemistries in three ranges, and COD standards for use on the advanced AQUAfast IV AQ4000 colorimeter, the economical AQUAfast II AQ2040 COD colorimeter or most competitive colorimeters. Accurate, reproducible results are available immediately after the digestion process.

Thermo Orion is an ISO 9001-registered manufacturer of quality chemical measurement products. Thermo Orion's line of products includes pH, ion selective electrode (ISE), colorimeters, conductivity and dissolved oxygen meter, electrodes, accessories, and solutions. Thermo Orion also offers a complete line of syringe pumps, microbalances, titrators and Pure Water™ online process monitors. Most recently, the company expanded its already extensive product offering to include a complete line of liquid-handling systems, auto sampler, the award-winning EZ-Flash® gas chromatography accessory, and the TEA Analyzer® detector for HPLC and GC. These systems prove that Thermo Orion is committed to providing the best instrumentation for a wide array of laboratory analyses.

Thermo Electron Corporation, Beverly, MA

READER SERVICE NO. 325

New Lightweight P–70 Industrial Spray Nozzle Made of Space-age Materials Ideal for Food Service Applications

Strahman Valves, Inc., a major provider of quality equipment to the food processing and manufacturing industries, introduces its P–70 spray nozzle specifically designed for wash down applications in the food service industry. The P–70 spray nozzle is a lightweight, industrial strength nozzle that weighs just 1.3 pounds. It has the same precision stainless steel and bronze internal parts as Strahman's legendary heavy-duty M–70 spray nozzle, used extensively in food manufacturing, but is much lighter to use.

According to Robert DuMont, product manager — Wash Down Equipment with Strahman Valves, "We have provided heavy-duty wash down equipment to the food processing industry for more than 50 years. Now, by taking advantage of the strength and durability of new lightweight materials, we are able to fulfill a need in the market with the P–70 spray nozzle for applications in the food service industry. The P–70 spray nozzle is our newest product introduction into this exciting new marketplace for Strahman Valves."

In addition to being lightweight, the P–70 spray nozzle provides an adjustable spray pattern ranging from a fine spray to a steady stream at 7 gpm. Its insulated, replaceable cover comes in black, red or white. Rated at 150 psi, the P–70 spray nozzle can consistently handle temperatures up to 200°F (93.33°C). "The space-age nozzle body designed for the P–70 provides a low co-efficient of heat transfer to the hand of the operator," added DuMont. "The ergonomic benefits are lightweight, low heat transfer, and a locking ring to keep the nozzle in an open locked position during use. Combined with an instant shut-off mechanism when the trigger is released, the P–70 is easy to use in cleaning and rinsing applications in commercial and institutional kitchens where large wash down equipment exist."

Strahman Valves, Inc., Florham Park, NJ

READER SERVICE NO. 326

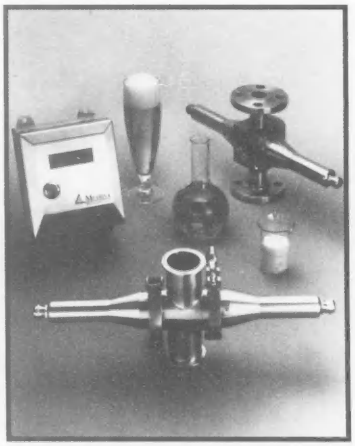
High Pressure Pumping Capability Offered by New SG-I0 External Gear Pumps from Viking Pump

Viking Pump has released the SG-I0 Series External Gear Pumps, developed to meet increasing demand for higher capacity and pressure. The SG-I0s add capacities in the 12 to 80 gpm flow range to Viking's existing spur gear family. The SG-I0 is rated to 500 psi on typical industrial applications, but may be applied up to 2,500 psi depending on the application. As with the smaller SG series pumps, this new series can pump liquids with viscosities ranging from 28 SSU through 1,000,000 SSU, and at temperatures from -40°F to 450°F. The SG-I0 External Gear Pump has features that will provide long pump life. Its cast-iron construction uses precision-ground, heat-treated gears and case-hardened steel shafts supported on both ends by anti-friction needle bearings or carbon graphite bushings, which offer long-life performance. The SG-I0 line comes standard with lip seals. Mechanical seals or the Viking Mag Drive® are optional. The pumps are available with motor-flange, foot bracketed or base mounting options.

The SG-I0 is part of Viking's spur gear family, ideal for high pressure and high viscosity pumping applications such as the heavier fuel oils and lube oils in cold climates. External gear pumps displace a precise amount of liquid with each revolution, and the series is designed to ensure that one pump is always within 20 percent of the application's exact capacity needs.

Viking Pump, Cedar Falls, IA

READER SERVICE NO. 327



Metrisa, Inc.

Metrisa, Inc. In-line Liquid Process Monitor for Turbidity, Suspended Solids, and Color

A new in-line system that features a compact transmitter and up to four sensors for process control, filter breakthrough, and color measurement applications is being introduced by Metrisa, Inc.

The Monitek® Messenger® Liquid Monitoring System features a wall-mount transmitter that is menu-driven for easy operation, Windows® compatible, and can accommodate up to four in-line sensors. Capable of monitoring turbidity, suspended solids, and color simultaneously, this versatile system can achieve a dynamic range as low as 0 to 1 ppm, 0 to 500 ppm, or 100 to 10,000 ppm, depending upon the sensors and application requirements.

Suitable for performing ASTM, APHA, and EBC measurements in real-time, the Monitek® Messenger® Liquid Monitoring System linearizes measurement values to let users see trend lines. Available with or without a local display, the system can be operated using a PDA, laptop, or an optional touch panel PC and provides an instant response with +1% FS accuracy. Optical or acoustic sensor bodies can be 3-A certified stainless steel.

Metrisa, Inc., Bedford, MA

READER SERVICE NO. 328

Fluid Imaging Technologies Introduces Free Testing Service to Demonstrate Ability to Photograph, Count and Analyze Cells and Particles

Water purity firm Fluid Imaging Technologies, has introduced a free service evaluating water samples including digitally photographing every targeted cell and/or contaminant detected, particle counting, sizing, classifying and determining frequency distribution. Ideal for water/wastewater engineers, process engineers, plant managers, environmental compliance officers, laboratory managers, and other professionals responsible for water quality, purity and/or security, the comprehensive, free testing service is conducted on the company's patented FlowCAM™ instrumentation, the breakthrough, high-speed flow cytometer with the unique ability to count, size and take digital pictures of waterborne organic contaminants such as anthrax, cryptosporidium and cyanobacteria as well as inorganic contaminants and other particles. In addition to the testing and analysis, the free service includes a CD of the evaluation recording the test results as digital images, a scatter diagram and a data spreadsheet documenting every particle or cell detected.

Fluid Imaging Technologies, Inc., Edgecomb, ME

READER SERVICE NO. 329

DuPont Qualicon BAX® System Adopted as AOAC Official Method for Detecting *Listeria monocytogenes*

The BAX® system, a genetics-based diagnostic tool from DuPont Qualicon, has been adopted by AOAC International as an *Official Method*℠ for detecting *Listeria monocytogenes* in food. This follows a similar action in July, when AOAC approved the BAX® system as an *Official Method*℠ for detecting *Salmonella*.

AOAC International is a provider and facilitator in the development, use and harmonization of validated analytical methods. AOAC *Official Methods*℠ are cited in the US code of federal regulations and adopted by standards organizations around the world. The *Official Methods*℠ program (OMA) provides for multi-laboratory validation of a method where the highest degree of confidence in performance is required to generate credible, defensible and reproducible results. The BAX® system for detecting *Listeria monocytogenes* was successfully validated and has been assigned AOAC *Official Method*℠ 2003.12.

"This esteemed recognition reinforces the confident results that food companies around the world have come to expect with the BAX® system," said Kevin Huttman, president of DuPont Qualicon. "As an AOAC *Official Method*℠, the BAX® system continues its advance as the best available science-based tool of choice in food safety and brand protection programs."

Listeria monocytogenes is a harmful species of bacteria present in the environment and carried in healthy animals. The pathogen has been found in raw foods, such as unwashed vegetables and uncooked meats, as well as ready-to-eat foods that become contaminated after processing, especially deli meats and soft cheeses. *Listeria monocytogenes* spreads very easily by direct contact and, unlike most other bacteria, can grow slowly at refrigerated temperatures.

Consumption of food contaminated with *Listeria monocytogenes* can cause listeriosis, a potentially fatal disease in newborns, the elderly and persons with weakened immune systems. Pregnant women have an increased susceptibility to listeriosis, which can lead to miscarriage or stillbirth. According to the Centers for Disease Control and Prevention, *Listeria monocytogenes* causes about 2,500 cases of listeriosis annually in the US, with a 20 percent fatality rate.

The BAX® system uses advanced molecular technology to detect target bacteria in raw ingredients, finished food products and environmental samples. In addition to *Listeria monocytogenes* and *Salmonella*, assays are also available for *E. coli* O157:H7, Genus *Listeria* and *Enterobacter sakazakii*. The automated system is user friendly and fits easily onto a laboratory bench top. Available since November 2000, hundreds of BAX® systems are already in use by governments, food companies and laboratories around the world.

In addition to the BAX® system, DuPont Qualicon markets the patented RiboPrinter® system, the only automated DNA fingerprinting instrument that rapidly pinpoints sources of bacteria in pharmaceuticals, personal care products and food.

Qualicon, Inc., Wilmington, DE

READER SERVICE NO. 330

High Capacity Conveyors with Integral Metal Detector from Eriez Magnetics

Eriez' combination VMC electromagnetic conveyor/metal detector units reduce the dangers of metal contaminants in conveyed products. These high capacity energy efficient conveyors include a VC Metalarm Detector in a three-foot section of the conveyor's trough. When metal is detected, the conveyor can be stopped or a reject gate activated. Ideal for plastic, food, chemical and pharmaceutical process and packaging.

The VMC Series Electromagnetic Conveyors use Eriez' patented AC electromagnetic drives, a variable-rate control and corrosion-resistant fiberglass springs for precise conveying of bulk materials. These rugged, high-capacity, two-mass units capable of moving product 60 ft/min, have no sliding or rotating parts to wear out or belts and bearings to fail, providing years of trouble-free service.

The conveyor's integral VC Metalarm Metal Detector uses pulse induction electronics to power the search coils eliminating the need for "product adjustments."

Standard tray sizes range from 18 to 48-inches (457 to 1219 mm) wide by 5 to 20-feet (1.5 to 6 m) long. With an easy-to-clean design, VMC conveyors can be built to USDA specifications, operate at noise levels below 65 dBA and can be either base or suspension mounted.

Eriez Magnetics, Erie, PA

READER SERVICE NO. 331

Precision Temperature Calibration with Small Diameter Probe from Blue Leopard Inc.

A new probe for high precision temperature calibration is now available for small diameters. Part of the Burns Engineering Series 12001 SPRT's for temperature metrology, the new probe offers a 1/8" diameter with Inconel™ sheathing. Utilizing Burns' proprietary sensor and probe design,

the temperature probe provides industry leading performance with the accuracy and reliability required in today's industrial and laboratory environments.

The probe features ±0.02°C accuracy with a nominal drift per year of 0.01°C at 200°C. The probe is specially manufactured with hermetic seals to lock out moisture and contaminants to insure long term performance. The device features a time constant of 3 milliseconds. Each probe comes with a NIST traceable ITS-90 calibration, certificate and unique serial number.

Available in 6", 9" and 12" lengths, the probe can be configured to a variety of calibration equipment including stationary baths, portable blocks and handheld readout equipment. This versatility allows the device to perform comparison calibration in the laboratory and in the field.

Blue Leopard Inc., Edina, MN

READER SERVICE NO. 332

Onset Computer Corp. Introduces Complete Solution for IAQ Monitoring

Onset Computer Corporation, a reliable, battery-powered data loggers, has introduced a complete Indoor Air Quality (IAQ) monitoring solution that combines the company's HOBO® data loggers with the Telaire® 7001 Carbon Dioxide (CO_2) Monitor.

Now, HVAC contractors, facilities managers, and others can measure and record CO_2 along with temperature and relative humidity in a broad range of IAQ applications. Examples include monitoring the performance of ventilation systems in office buildings, locating the presence of combustion byproducts in manufacturing plants, and identifying IAQ problems in schools.

Onset Computer Corp.

Like HOBO data loggers, the Telaire 7001 monitor is an easy-to-use, battery-powered device that can be used in a broad range of commercial and residential environments. It measures and outputs CO_2 levels over the range of 0 to 2500 ppm with 10 ppm resolution to HOBO loggers, calculates and displays ventilation rates based on outside CO_2 concentrations, and provides stable, high-accuracy CO_2 readings.

The Telaire 7001 CO_2 monitor is available immediately, and can be used with a broad range of HOBO data loggers, including the company's new high-resolution, direct-USB HOBO U12 Family loggers.

Onset Computer Corporation, Pocasset, MA

READER SERVICE NO. 333

Guardian Clean-room Liner from Grayling Industries Protects Products from Particulate Contamination during Shipping and Storage

Grayling Industries introduces the Guardian™ Clean-Room form-fit disposable liner to protect particulate sensitive products during shipping and storage. The disposable Clean-Room liner may be constructed to fit a variety of container types, including FIBC's, totes and boxes. The liners are manufactured in a certified class 100,000 clean-room.

Like Grayling Industries' other Guardian™ liners, the Clean-Room liner eliminates the need to decontaminate containers. This reduces the cost of packaging and insures product integrity. In addition, the form-fitted construction of Guardian™ liners eliminates traps and folds that can cause residual product loss and hinder the fill and discharge processes. The unique manufacturing process creates the form-fitted liner from lay-flat folded film, minimizing the handling of the film and thereby reducing the chance of particulate contamination. Laminated and co-extruded film structures are customized to meet the user's specific requirements for protection.

Grayling Industries, Alpharetta, GA

READER SERVICE NO. 334

COMING EVENTS

JANUARY

- **12–13, HACCP I: Documenting HACCP Prerequisites,** Guelph Food Technology Centre, Guelph, Ontario, Canada. For more information, contact Marlene Inglis at 519.821.1246; E-mail: minglis@gftc.ca.
- **14–16, HACCP II: Developing Your HACCP Plan,** Guelph Food Technology Centre, Guelph, Ontario, Canada. For more information, contact Marlene Inglis at 519.821.1246; E-mail: minglis@gftc.ca.
- **21–22, ServSafe® for the Food Industry and Food Service,** Guelph Food Technology Centre, Guelph, Ontario, Canada. For more information, contact Marlene Inglis at 519.821.1246; E-mail: minglis@gftc.ca.
- **22–23, ASI Principles of HACCP Workshop,** Orlando, FL. For more information, call Jeanette Huge at 800.477.0778 ext. 113; E-mail: jhuge@asifood.com.
- **26–27, Quality Improvement Associate (ASQ), Part I,** Guelph Food Technology Centre, Guelph, Ontario, Canada. For more information, contact Marlene Inglis at 519.821.1246; E-mail: minglis@gftc.ca.
- **28, The Second Global Congress Dedicated to Hygienic Coatings and Surfaces,** Orlando, FL. For more information, phone 44.0.20.8614.4811; E-mail: j.saraty@pra.org.uk.
- **28–30, International Poultry Exposition,** Georgia World Congress Center, Atlanta, GA. For more information, contact Jackie Stewart at 770.493.9401; E-mail: jstewart@poultryegg.org.

FEBRUARY

- **17, HACCP: A Management Summary,** Guelph Food Technology Centre, Guelph, Ontario, Canada. For more information, contact Marlene Inglis at 519.821.1246; E-mail: minglis@gftc.ca.
- **17–19, Kentucky Association of Milk, Food and Environmental Sanitarians,** Hurstbourne Hotel, Louisville, KY. For more information, contact Sue Jewell at 859.371.2278.
- **19–20, ASI Principles of HACCP Workshop,** Las Vegas, NV. For more information, call Jeanette Huge at 800.477.0778 ext. 113; E-mail: jhuge@asifood.com.
- **23–26, California Association of Dairy and Milk Sanitarians Dairy Industry Conference,** Montebello Country Club/ Hilton Garden Inn, San Clemente, CA. For more information, contact John Bruhn at 530.752.2192.

MARCH

- **17–19, Food Safety Summit and Expo,** Washington, D.C. For more information, call 800.746.9646 or www.foodsafetysummit.com.
- **29–31, First World Congress on Organic Food:** *Meeting the Challenges of Safety and Quality for Fruits, Vegetables, and Grains,* Kellogg Hotel and Conference Center, Michigan State University, East Lansing, MI. For more information, E-mail: mitzelf3@cvm.msu.edu.

APRIL

- **16–21, Conference for Food Protection,** San Marcos Resort, Chandler, (Phoenix) AZ. For more information, call Trevor Hayes at 408.848.2255; E-mail: TWHgilroy@aol.com.

MAY

- **15–20, IFFA Delicat,** Frankfurt, Germany. For more information, contact Dirk Ebener at 770.984.8016; E-mail: info@usa.messefrankfurt.com.
- **26, Metropolitan Association for Food Protection Annual Spring Meeting,** Rutgers, Cook College, New Brunswick, NJ. For more information, contact Carol Schwar at 908.689.6693.

IAFP UPCOMING MEETINGS

AUGUST 8-11, 2004
Phoenix, Arizona

AUGUST 14-17, 2005
Baltimore, Maryland

AUGUST 13-16, 2006
Calgary, Alberta, Canada

CAREER SERVICES SECTION

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Send your job ads to Donna Bahun at dbahun@foodprotection.org or to the Association office: 6200 Aurora Ave., Suite 200W, Des Moines, IA 50322-2864; Phone: 800.369.6337; 515.276.3344; Fax: 515.276.8655.

International Association for Food Protection®

IAFP Members

Did you know that you are eligible to place an advertisement if you are unemployed and looking for a new position? As a Member benefit, you may assist your search by running an advertisement touting your qualifications.

Director
National Center for Food Safety & Technology

The Center (NCFST), founded in 1988, at Illinois Institute of Technology is a unique consortium of food industry companies, the U.S. Food and Drug Administration and university based scientists.

Located in west suburban Chicago on IIT's Moffett Campus, the Center staff includes scientists, and support staff, as well as FDA's Division of Food Processing and Packaging. NCFST includes processing and packaging pilot plants, well-equipped laboratories, and a library/information center. A Level 3 Biosafety Laboratory and pilot plant is currently in the design and construction phase. Upon completion, the Center will apply for CDC licensing for select agent research.

Seeking a dynamic executive to provide leadership in the growth and development of the Center. Direct collaborative, multi-client and proprietary research as well as scientific and educational programs with industry, government and academic institutions. Develop marketing and public relations programs that foster an atmosphere of positive and dynamic interaction among Center members from governmental, industrial and academic venues. Design strategic and operational plans, assure that local, state and national requirements for safety and security are met and exercise general oversight of the physical campus.

Must possess demonstrated record of entrepreneurial leadership. Ability to direct diverse scientific and technical entities in a unified research program. Advanced degree preferred.

IIT is a private Ph.D.degree-granting university for science, engineering and the professions. Visit http:/***www.ncfst.iit.edu***.

Respond with resume/curriculum vitae and names and addresses of three professional references to ***ncfst@iit.edu***

Illinois Institute of Technology is an affirmative action, equal opportunity employer.

The index and/or table of contents has been removed and photographed separately within this volume year.

For roll film users, this information for the current volume year is at the beginning of the microfilm. For a prior year volume, this information is at the end of the microfilm.

For microfiche users, the index and/or contents is contained on a separate fiche.

INTERNATIONAL ASSOCIATION FOR FOOD PROTECTION

General Fund Statement of Activity For the Year Ended August 31, 2003

Revenue:		
Advertising	$	123,950
Membership & Administration		428,239
Communication		680,023
Annual Meeting		593,407
Workshops		13,980
Total revenue	$	1,839,599
Expense:		
Advertising		104,816
Membership & Administration		543,871
Communication		672,163
Annual Meeting		418,170
Workshops		9,704
Total expense	$	1,748,724
Change in General Fund	**$**	**90,875**
Net Assets as of 8/31/03:		
General Fund		26,868
Foundation Fund		173,935
Restricted Fund		40,656
Speaker Travel Fund		27,399
Total net assets	$	268,858

IT'S A FACT

Did you know? IAFP has Affiliate Organizations across the United States and other countries

Go to page 1034 or visit our Web site for a current listing

ADVERTISING INDEX

Journal of Food Protection®

ISSN: 0362-028X
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International Association for Food Protection

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Vol. 66 **November 2003** **No. 11**

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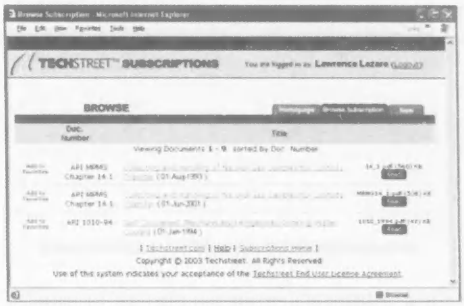

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- ❒ D1030 Cold Hard Facts
- ❒ D1040 Ether Extraction Method for Determination of Raw Milk
- ❒ D1060 Frozen Dairy Products
- ❒ D1070 The Gerber Butterfat Test
- ❒ D1080 High-Temperature, Short-Time Pasteurizer
- ❒ D1090 Managing Milking Quality
- ❒ D1100 Mastitis Prevention and Control
- ❒ D1105 Milk Hauler Training
- ❒ D1110 Milk Plant Sanitation: Chemical Solution
- ❒ D1120 Milk Processing Plant Inspection Procedures
- ❒ D1125 Ohio Bulk Milk Hauling
- ❒ D1130 Pasteurizer – Design and Regulation
- ❒ D1140 Pasteurizer – Operation
- ❒ D1150 Processing Fluid Milk (slides)

ENVIRONMENTAL

- ❒ E3010 The ABCs of Clean – A Handwashing & Cleanliness Program for Early Childhood Programs
- ❒ E3020 Acceptable Risks?
- ❒ E3030 Air Pollution: Indoor
- ❒ E3031 Allergy Beware
- ❒ E3040 Asbestos Awareness
- ❒ E3055 Effective Handwashing–Preventing Cross-Contamination in the Food Service Industry
- ❒ E3060 EPA Test Methods for Freshwater Effluent Toxicity Tests (Using Ceriodaphnia)
- ❒ E3070 EPA Test Methods for Freshwater Effluent Toxicity Tests (Using Fathead Minnow Larva)
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- ❒ E3080 Fit to Drink
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- ❒ E3140 Putting Aside Pesticides
- ❒ E3150 Radon
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- ❒ E3180 The New Superfund: What It is & How It Works–(2) Changes in the Removal Process: Removal & Additional Program Requirements
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- ❒ E3210 The New Superfund: What It is & How It Works – (4) Emergency Preparedness & Community Right-to-Know
- ❒ E3220 The New Superfund: What It is & How It Works – (5) Underground Storage Tank Trust Fund & Response Program
- ❒ E3230 The New Superfund: What It is & How It Works – (6) Research & Development/Closing Remarks
- ❒ E3240 Sink a Germ
- ❒ E3245 Wash Your Hands
- ❒ E3250 Waste Not: Reducing Hazardous Waste

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- ❒ F2450 A Guide to Making Safe Smoked Fish
- ❒ F2005 A Lot on the Line
- ❒ F2007 The Amazing World of Microorganisms
- ❒ F2008 A Recipe for Food Safety Success
- ❒ F2009 Basic Personnel Practices
- ❒ F2440 Cleaning & Sanitizing in Vegetable Processing Plants: Do It Well, Do It Safely!
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- ❒ F2503 Tape 4–Food Production
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- ❒ F2039 Food for Thought – The GMP Quiz Show
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- ❒ F2045 Food Microbiological Control (6 Videos)
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- ❒ F2090 Food Safety: An Educational Video for Institutional Food-Service Workers *Food Safety for Food Service – Series I*
- ❒ F2100 Tape 1–Cross Contamination
- ❒ F2101 Tape 2– HACCP
- ❒ F2102 Tape 3–Personal Hygiene
- ❒ F2103 Tape 4–Time and Temperature Controls *Food Safety for Food Service – Series II*
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- ❒ F2105 Tape 2– Handling Knives, Cuts and Burns
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- ❒ F2130 Food Safety: You Make the Difference
- ❒ F2125 Food Safety Zone: Basic Microbiology
- ❒ F2126 Food Safety Zone: Cross Contamination
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	Before Disaster Strikes…A Guide to Food Safety in the Home (minimum order of 10)	.60	1.20	
	Food Safety at Temporary Events (minimum order of 10)	.60	1.20	
	*Developing HACCP Plans–A Five-Part Series (as published in *DFES*)	15.00	15.00	
	*Surveillance of Foodborne Disease – A Four-Part Series (as published in *JFP*)	18.75	18.75	
	*Annual Meeting Abstract Book Supplement (year requested _____)	25.00	25.00	
	*IAFP History 1911-2000	25.00	25.00	

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The International Association for Food Protection, founded in 1911, is a non-profit educational association of over 3,000 food safety professionals with a mission ***"to provide food safety professionals worldwide with a forum to exchange information on protecting the food supply."*** Members belong to all facets of the food protection arena, including Industry, Government and Academia.

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- ***Food Protection Trends***— Published as the general Membership publication, each issue contains refereed articles on applied research, applications of current technology and general interest subjects for food safety professionals. Regular features include industry and association news, an industry-related products section and a calendar of meetings, seminars and workshops.
- ***Journal of Food Protection*** — First published in 1937, the Journal is a refereed monthly publication. Each issue contains scientific research and authoritative review articles reporting on a variety of topics in food science pertaining to food safety and quality.
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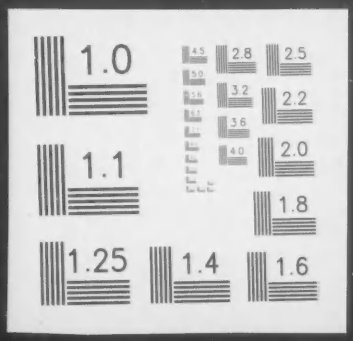
IAFP 2004

Phoenix, Arizona

August 8-11, 2004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